

EFFECT OF ENVIRONMENTAL VOLATILITY ON HEALTH STATUS OF POULTRY BIRDS WITH SPECIAL REFERENCE TO EGG PRODUCTION

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Abstract—Environmental volatility chiefly influences health status of hens in the poultry farms and this results in disturbances of egg production in many ways. The ideal temperature for a hen is 18-24^o C. The heat stress is an important environmental challenge which the emerging poultry industry faces. The feed intake is decreased due to heat stress. The egg production is decreased by increasing heat stress and it leads to increasing breakage of eggs which resulting from poor shell thickness. On the other hand, cool climate also affect the hens' health status and hens are exposed to several diseases.

Index Terms—Heat stress, Egg Production, Low intake of feed, Egg Quality, Cool Climate, Diseases, Health Status.

1. INTRODUCTION

Changes in the environment greatly affect the poultry birds' health and egg productivity. If the temperature prevails in the environment rises above the ambient temperature, hens are affected severely according to rising temperature. The increasing heat stress affect the sweat glands leading to poor intake of feed. Heat stress heavily affects the older hens than younger hens. The ideal temperature for a hen is 18-24^o C.

Hen eats less feed resulting in smaller egg size and lower egg production when the temperature increases above 30^o C. High temperature coupled with high humidity have harmful effects and heat stress interferes with the birds' comfort and suppresses productive efficiency. Evaporation takes place in the hens through panting since the hens do not have sweat glands on the skin.

Hot and humid conditions are more harmful than hot and dry conditions. On the other hand, very cold also affect the egg production. This is because of the fact that hen's body concentrates more on keeping warm than laying eggs. During the extreme cold conditions hens become stressed and this results in ability to withstand diseases through immunosuppressant leading to reduction in egg production.

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During this season various pathogenic and parasitic diseases that may affect hens' health. Hens expose to diseases such as Infectious Bursal Diseases (IBD), Fowl Pox, Fowl Cholera, Salmonellosis, Escherichia coli, Pullorum Disease during the winter and wet season. These seasonal fluctuations either directly or indirectly affect the egg production. Dust materials in the farm place causes irritation of the respiratory tract and the environment must not be dusty. Many practical measures should be taken to protect the hens from these effects such as better farm management.

Heat Stress-Environmental Challenge

The heat stress is one of the most vital environmental challenges which the emerging poultry industry faces. This is the matter of great concern and this challenge is being faced by poultry farms not only in a specific region but also in the world. Today the poultry sector worldwide faces the problem of heat stress and this sector is forced to find means and measures for managing this. The heat stress greatly influences the poultry operations and the poultry production is affected to a larger extent. The quality of eggs and their components are severely affected by heat stress (Lucas *et al.*, 2013).

The heat stress affects the laying hens and broilers differently according to nature of hens such as age, pattern of laying and time of oviposition. Hens with different ages are affected differently. An ordinary temperature of 27 to 28 degree Celsius does not affect the egg production. The low intake of feed by hens does not affect the egg production in any way at this temperature (Tumova and Gous, 2012). The high environmental temperature is a non-genetic factor that affect egg production and egg quality. Hens reared under thermally stressed condition, severely affected which leads to poor performance of egg production and poor egg shell thickness. This affects the physiological functions of hens, functions of ductless glands and acid-base balances in the hens (Oguntunji and Alabi, 2010).

Reduction of Feed intake and Egg Production

The sufficient feed intake is a must for every bird irrespective of climatic change. However, in practice, the intakes of feed and resulting effects on the egg production are largely depending upon environmental condition such as heat stress. A moderate heat prevails in the environment does not affect the feed intake of birds and the egg production is not disturbed. The severe heat stress affect the feed intake of hens in the poultry farms and thereby the egg production is also affected accordingly. The amount of feed intake was reduced and drinking was increased among the broilers when they were under heat stress. Birds attempted to avoid damages from the heat stress by increasing the time spent on drinking and birds reduced eating time (Li *et al.*, 2015)

The egg production is decreased by increasing heat stress. The reduction in the percentage of egg production is increased with the increasing days with heat stress (Farnell *et al.*, 2001). The heat stress is considered to be serious phenomena in the case of feed intake and egg production. It was also found that the heat stress influence negatively on feed intake and egg production.

On account of severe heat stress, the egg weight is also affected. The heat stress reduced feed intake, egg production and egg weight among the laying hens. The emerging production methods in the poultry farms make heat stress among the birds since there are large numbers of birds are accommodated (Defra) along with the heat stress produced from the environment.

There is negative relationship between the temperature and feed intake. The feed intake of hens reduced at high temperature. This is because of the fact that hens required more amount of energy to conserve the heat caused by high temperature (Obayelu Abiodun Eijiah and Adeniyi Adedaapo, 2006).

Effect on Egg Quality

Egg quality is very important from the producers and consumers point of view. The specific gravity of an egg and its shell thickness are very important in the marketing of eggs. The physical quality of these parts of eggs maintains the internal parts of eggs which should be preserved till consumption. The poor shell thickness cause for egg breakage which facilitates contamination of eggs. The heat stress caused for increasing breakage of eggs which resulting from poor shell thickness (Lin *et al.*, 2004). Some studies concluded that the heat stress decreased the egg quality traits in newly developed layers. The producers and consumers are affected negatively due to poor egg quality owing to heat stress. Care should be given in the construction and management of poultry houses and anti-heat stress measures should be taken in the regions where warm climate prevails (Ismail, 2015).

In order to keep quality of eggs, laying hens should be reared in a comfortable environment with sufficient care.

Since the egg production depends upon the prevailing environment around the poultry farms, the normal range of temperature should be allowed.

The egg size is negatively affected during the abnormal temperature in the environment

Under the abnormal temperature, the metabolism is disturbed and it leads to malfunctions of physiological functions and this will results in poor egg production

Therefore the environmental stressors should be managed so that the egg production is not affected negatively (Talukder *et al.*, 2010).

Outbreak of Diseases

The ambient relative humidity does not affect the egg production and health status of the hens in the poultry farms. However it was found that there is tradeoff between the relative humidity and egg production. The egg production decreases under the state of increasing relative humidity. On the other hand, high relative humidity encourages outbreak of diseases and which reduces egg production. Therefore care should be given while selecting the species of hens in the poultry farms. The chosen hens should be according to prevailing climatic conditions. Establishing the necessary and appropriate housing is very important. Sanitation practices have to be taken in order to minimize heat and spread of diseases (Obayelu Abiodun Eijiah and Adeniyi Adedaapo, 2006). During the cold season, fungus are grown in the environment due to higher humidity which cause for respiratory problems (Sophie Miyumo, 2016).

The following diseases are commonly found during the rainy seasons:

i) E-Coli and Salmonella

This occurred because of poor sanitation prevails in the farm and wet condition. The common symptoms include breathing problems, loss of appetite, depression, poor growth rate. This can be controlled by administering oral medicine and mainlining good sanitation in the farms.

ii) Fowl Pox

This is occurred due to mosquitoes and blood sucking insects during the rainy season. These insects play crucial role in transmission of this disease. Loss of appetite, difficult to breath, swollen eyelids and soiled feathers are the some of the symptoms of this disease.

iii) Gumboro

This is a viral infection and this disease greatly affects young hens. Hens may be exhibit acute prostration, diarrhea and inflammation of the cloaca. Proper vaccination can be practiced in order to avoid this kind of diseases during rainy and winter seasons.

iv) Fowl Cholera

The fowl cholera may be temporary or chronic. There may be sudden death in the case of temporary fowl cholera. Swellings of legs, swelling around eyes are the common symptoms of this disease. However, fowl typhoid has the similar symptoms among the hens.

Effect of cool climate

Like that of heat stress in the environment which affect the egg production, the cool climate during winter also affect the egg production and health status of the hens in the poultry farm. The following measures to be taken to have smooth egg production and keeping sound health of hens.

Egg production is influenced by light and therefore sufficient light is provided in the poultry farm. A total of fifteen hours of light is a must during the winter in order to lay eggs.

During winter hens need more amount of protein in their feed to warm up their bodies which is essential for egg production.

Providing liquid water is essential especially warm water to hens if possible which keep hens' body warm and egg production is not disturbed. The warm water may be given several times a day.

The right type of breed can be reared in the poultry farms in such a way that hens manage the seasonal changes.

CONCLUSION

Poultry industry has been witnessing many challenges including environmental stressors that severely affect the health of the hens and egg production. The environmental stressors differed from region to region in the same country and from one country to another. Therefore the poultry farms have to be established in such a way that they are according to native environment which is most suitable to it. Different varieties of species of hens are available and care should be taken while selecting hens during the establishment of poultry farms. Besides, proper layout of the farm which facilitates to provide sufficient light and air can be chalked out. Periodical assessment of hens' health status should be inspected during seasonal changes and actions should be taken accordingly. Necessary preventive measures should be taken to check many health discomforts of hens. The egg production can be maintained well if all these measures are taken.

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