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Original Research

Mortality Pattern among Poultry Stock Reared under Intensive Management in Sub temperate Condition of Himachal Pradesh

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Abstract

A study was undertaken to assess mortality pattern among poultry birds across different season maintained at CSK Himachal Pradesh Agricultural University Poultry Farm, Palampur under intensive management system. Data on mortality were collected from mortality records maintained at University Poultry Farm, Palampur. The four different types of birds were reared viz. Dahlem Red (DR), Native (N), cross of Dahlem Red and Native (DN), and cross of DN with DR (DND). A total of 641 birds were subjected for necropsy examinations at the Department of Veterinary Pathology, Palampur. Coccidiosis (33.54%), enteritis (12.16%), chilling (10.61%), ascaridiasis (10.29%) and egg blockage (9.82%) were major cause of mortality among poultry stocks. Seasonal disease incidence revealed that during winter chilling, enteritis and omphalitis were major diseases prevalent. In summers, vent pecking and coccidiosis were observed to be highest and ascaridiasis, coccidiosis, omphalitis and egg-bound condition were found to be major cause of mortality in rainy season. Overall mortality rate was reported to be highest in rainy (41.49%), followed by winter (34.32%) and summer season (24.18%). Age wise study exhibited that major cause of mortality in starter birds were chilling, omphalitis and coccidiosis. Among growers, coccidiosis was found to be the main cause of mortality. In layers, egg blockage, liver rupture, vent pecking and enteritis were more prevalent. Overall, mortality percentage was observed to be highest in DR birds (57.72%), followed by DND (15.28%), Native (13.88%) and DN (13.10%).

Keywords: Coccidiosis, Chilling, Mortality, Poultry

Introduction

Poultry is one of the fastest growing industry in India. Over the last 2-3 decades poultry production has witnessed substantial growth @ 8-10% per annum (BAHS, 2019). This rapid expansion of poultry industry has led to the upliftment of economy of the farmers. With the fast development of poultry industry, one of the major constraints is outbreak of devastating disease undermining the economy of the poultry enterprise. Occurrence of diseases has increased many folds which remain the major problem affecting its economy (Kumar *et al*., 2018). The mortality records are of immense importance to know the prevalence of diseases for adopting preventive and control measures. Laying hens raised primarily for egg production are at a higher risk of production losses, higher disease incidence, inclement weather and death due to longer rearing (≥72 weeks) compared to meat type chicken (Sorensen, 1992).

Diseases that have negative impact on production and increase mortality in layer hens include Newcastle disease, Coccidiosis, Infectious Bursal Disease, Fowl typhoid, fowl cholera, infectious laryngo-tracheitis, Marek's disease, Mycoplasma infections, infectious coryza, egg prolapse, aflatoxicosis, necrotic enteritis and E. coli infections and these can contribute to mortality and egg production losses of up to 50% based on severity (Shittu *et al*., 2014).The occurrence of such diseases has remained a major constraint affecting poultry production based economy in India. One of the ways to minimize the disease associated losses is to understand the status and pattern of diseases. Poultry birds are generally affected by weather, seasonal and climatic changes. For instance, in the cold season, chickens eat more feed, drink less water and huddle together to generate heat and keep them warm. On the other hand, in hot season, chickens consume less feed and drink more water in order to cool their body. These climatic extremes create stress among birds and immune system is affected. Considering the importance of poultry for the livelihood and its role in providing supplementary income to the farmers, the study was undertaken to assess the disease associated mortality pattern across different seasons in poultry stock managed in intensive management system under All India Coordinated Research on Poultry Breeding.

Materials and Methods

The study was carried out at University Poultry Farm of CSK Himachal Pradesh Agricultural University, Palampur under AICRP on Poultry Breeding. Data on mortality were collected from mortality records from March 2019 to April 2020. All chicks were brooded up to six weeks of age and thereafter transferred in floor pens on deep litter system for a period of 72 weeks. The four different types of birds were reared viz. Dahlem Red (DR), Native (N), cross of Dahlem Red and Native (DN) and cross of DN with DR (DND). The birds were classified according to age into three groups viz. 0-42 days (starter), 43-126 days (grower) and 127 days and above (adult). The birds were provided starter feed up to 0-6 week, grower feed 7-18 week and layer feed 18 week onwards. Dahlem Red is an egg-purpose breed of chicken, imported from Germany to India. It is a red-feathered breed which lays brown tinted eggs with good egg weight and is known for its high disease tolerance and immune competence (Kundu *et al.*, 1999). Dahlem Red birds were procured from Central Poultry Development Organisation (CPDO), Chandigarh, whereas native birds were purchased from farmers of Himachal Pradesh and further reproduced through selective breeding. DR and Native birds were subsequently utilized in cross breeding programme for production of DN and DND crosses. DN cross were developed by crossing Dahlem Red with native (DN, 50% DR inheritance) and DND crosses were developed by crossing DN male (F_1) with DR female to produce DND (75% DR inheritance) crosses. Necropsy examinations were carried out as per approved procedure (Chauhan and Roy, 2003) at the Department of Veterinary Pathology, DGCNCOVAS, CSKHPKV, Palampur. Laboratory tests were conducted to confirm specific cause of deaths as and when required (Brar *et al*., 2004). A total of 9137 were housed in poultry farm out of which 641 dead birds were subjected to postmortem examination. Year was classified into 3 seasons: March to June comprised the summer months, July to October the rainy months and November to February the winter season. Statistical analysis of the data was carried out as outlined by Snedecor and Cochran (1994) and SPSS software was utilized for the said purpose.

Results and Discussion

Coccidiosis (33.54%) followed by enteritis (12.17%), chilling (10.61%), ascaridiasis (10.29%) and egg blockage (9.83%) were major cause of mortality among poultry stocks (Table 1). Incidence of coccidiosis (33.54%) was major cause of death. The results of present study are in agreement with the earlier findings of Abdisa *et al*. (2019) who revealed high incidence of coccidiosis in poultry managed under intensive management system due to increased likelihood of high oocysts accumulation in litter. Furthermore, the higher stocking densities have been linked with

increased incidence of coccidiosis due to higher rate of infection and transmission of the coccidian oocyst in dense flocks. Mortality due to coccidiosis was higher in DR (67.44%) than DN (12.09%), DND (11.16%) and native birds (9.30%) (Fig. 1).

Table 1: Disease associated mortality (%) pattern among poultry stock

Diseases/Strain	DR	Native	DN	DND	Total Mortality %
Coccidiosis	67.44 (145)	9.30 (20)	12.09 (26)	11.16 (24)	33.54 (215)
Enteritis	67.95 (53)	7.69 (6)	5.13 (4)	19.23 (15)	12.17 (78)
Chilling	51.47 (35)	22.06 (15)	14.71 (10)	11.76 (8)	10.61 (68)
Ascaridiasis	45.45 (30)	15.15 (10)	12.12 (8)	27.27 (18)	10.29 (66)
Egg Blockage	47.62 (30)	23.81 (15)	12.70 (8)	15.87 (10)	9.83(63)
Omphalitis	44.64 (25)	26.79 (15)	16.07 (9)	12.5 (7)	8.74(56)
Vent pecking	41.93 (13)	9.68 (3)	16.13 (5)	32.26 (10)	4.84 (31)
Liver rupture	45.45 (10)	0.00 (0)	27.27 (6)	27.27 (6)	3.43 (22)
E.Coli	76.92 (10)	0.00 (0)	23.08 (3)	0.00 (0)	2.03(13)
Non-Diagnostic	65.52 (19)	17.24 (5)	17.24 (5)	0.0 (0)	4.52 (29)
Total Mortality%	**57.72 (370)**	**13.88 (89)**	**13.10 (84)**	**15.29 (98)**	

Values under bracket indicates number of dead birds

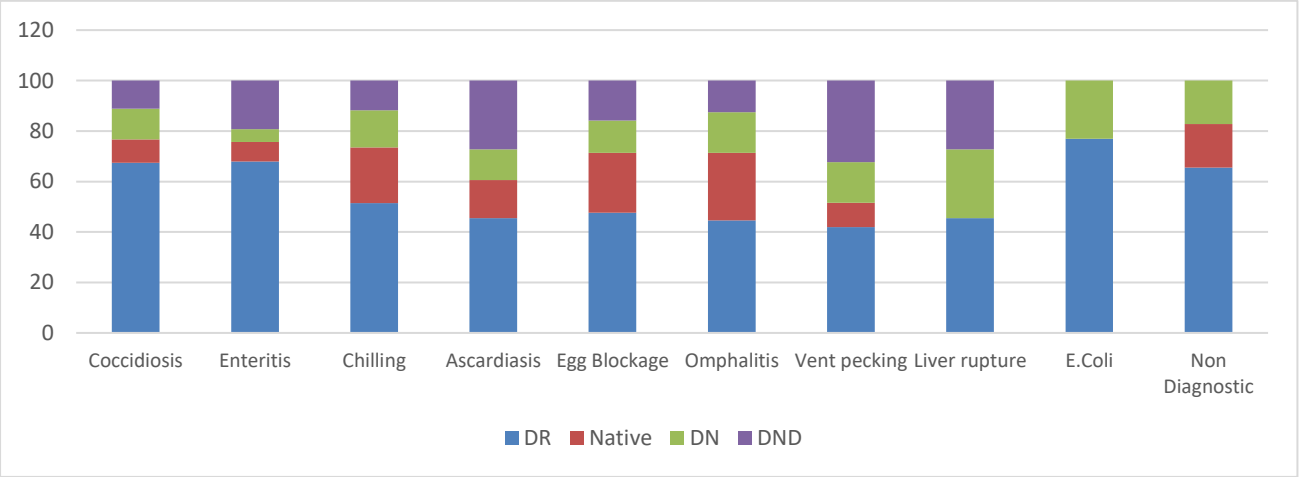

Figure 1: Mortality percentage due to diseases in DR, Native, DN and DND

Prevalence of coccidiosis was least among Desi birds than other stocks. Enteritis too was more prevalent in DR (67.95%) as compared to DND (19.23%), Native (7.69%) and DN (5.13%). Similarly, mortality due to chilling was more in DR (51.47%) compared to native birds (22.06%) while it was least in DND and DN (11.76% and 14.71%). Egg bound/egg blockage condition was found to be an important cause of death in layers and found to be highest in DR birds (47.62%) followed by native (23.81%), DND (15.87%) and DN (12.70%). This might be due to good egg production and large egg size in DR. Young pullets laying an unusually large egg is more prone to the problem. When impaction occurs in the uterus or vagina, egg enclosed by shell membranes may be found in the abdominal cavity. This indicates that eggs continued to form but were refluxed back into the peritoneal cavity. In a similar study Kumar *et al*. (2018) recorded mortality due to egg bound condition as 1.90% in layer chicken birds in and around Ranchi.

Overall mortality percentage was observed to be significantly ($p<0.05$) higher in DR (57.72%), followed by DND (15.29%), Native (13.88%) and DN (13.10%). DR birds witnessed highest mortality due to higher stock density. The results of the present study are in agreement with earlier report of Benyi *et al.* (2006) who reported significant association between stocking density and mortality among layer birds. The difference in mortality was found to be non-significant among DN and DND. Jha *et al.* (2012) studied the disease incidence in poultry under intensive management at BAU, Ranchi and reported that chilling/coryza (31.32%), nephrosis (21.24%), yolk sac infection

(13.44%), enteritis (12.90%), coccidiosis (9.81%), colibacillosis (6.28%) and in layers oophoritis (5.01%) were the major causes of mortality in Vanaraja, Grampriya and desi birds. Kumar *et al*. (2018) observed that chilling/coryza (42.41%) enteritis (12.94%), nephrosis (10.48%), yolk sac infection (7.73%), coccidiosis (6.83%), colibacillosis (5.88%), ascardiasis (5.60%), oophoritis (5.43%), egg bound condition (1.90%) and egg peritonitis (0.78%) were the major causes of mortality in poultry in and around Ranchi.

Seasonal analysis revealed that during summer season, incidence of vent pecking and coccidiosis remained high. In rainy season ascaridiasis, coccidiosis, omphalitis and egg-bound condition was found to be highest. The incidence of chilling and enteritis was observed to be the highest during winter season (Fig. 2). The difference in mortality during rainy and winter was significantly ($p<0.05$) higher than the summer season. However, no significant difference was observed among mortality incidence during rainy and winter season. The overall mortality rate was found to be significantly ($P<0.05$) higher in rainy (41.49%), followed by winter (34.32%) and least during summer season (24.18%) (Table 2).

Table 2: Season wise mortality (%) due to different diseases among poultry

Diseases/season	Summer	Rainy	Winter	Total Mortality %
Coccidiosis	27.44 (59)	49.77 (107)	22.79 (49)	33.54 (215)
Enteritis	19.23 (15)	30.77 (24)	50.0 (39)	12.17 (78)
Chilling	11.76 (8)	14.71 (10)	73.53 (50)	10.61 (68)
Ascardiasis	24.24 (16)	57.57 (38)	18.18 (12)	10.29 (66)
Egg Bound condition	23.81 (15)	39.68 (25)	36.51 (23)	9.83 (63)
Omphalitis	16.07 (9)	46.43 (26)	37.50 (21)	8.74 (56)
Vent Pecking	32.26 (10)	35.48 (11)	32.26 (10)	4.84 (31)
Liver rupture	22.73 (5)	54.54 (12)	22.73 (5)	3.43 (22)
E.Coli	23.08 (3)	53.85 (7)	23.08 (3)	2.03 (13)
Non-Diagnostic	51.72 (15)	20.69 (6)	27.59 (8)	4.52 (29)
Total Mortality %	**24.18 (155)**	**41.49 (266)**	**34.32 (220)**	

Values under bracket indicates number of dead birds

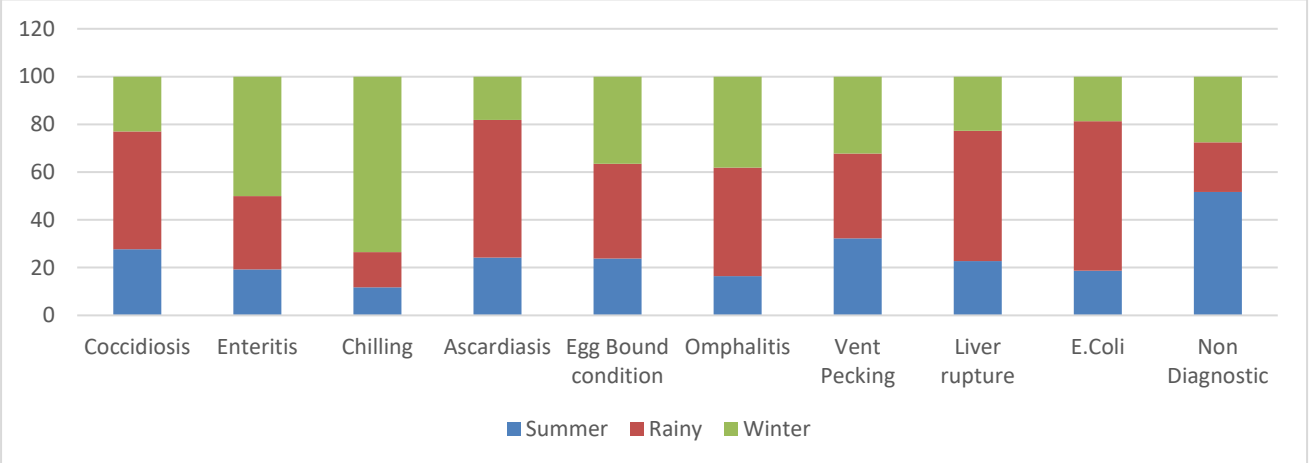

Figure 2: Season wise mortality percentage in DR, Native, DN and DND

Coccidiosis, a major killer had highest prevalence in rainy season (49.77%) followed by summer (27.44%) and winter season (22.79%). Dampness and wetness during rainy season favors the propagation and spread of disease causative organisms and parasites. Hence, most poultry farmers experience high morbidity and mortality rate during this period. Mortality due to chilling in winter season may be attributed to extreme cold climatic conditions in the region which predisposes the poultry to a variety of infectious diseases. The region experiences relatively pleasant climatic conditions during summers. Hence, lower mortality rates were reported in the birds during this season. Jha *et al*. (2012) observed in layer chickens that mortality rate was found to be highest during winter season (43.76%), followed by rainy season (35.15%) and least during summer season (21.11%). Madhavtar *et al*. (2019) revealed

seasonal influence of mortality in layer chickens and showed significantly (P<0.01) higher mortality during summer (58.70%) followed by monsoon (27.86%) and winter (13.43%) months.

Age-wise study of mortality and incidence of disease revealed that starters were more susceptible to chilling, omphalitis and coccidiosis (Table 3). Kumar *et al*. (2018) revealed that starters were more susceptible to chilling, yolk sac infection, enteritis, nephrosis, coccidiosis and colibacillosis. Growers were more vulnerable to coccidiosis with high mortality due to this disease (70.23%) (Fig. 3). The result of present study are consistent with the earlier report of Lalwal *et al*. (2016) who studied the prevalence of coccidiosis among village and exotic breed of chickens in Maiduguri, Nigeria and reported high prevalence rate of 58.9% among growers as compared to with respective prevalence of 36.3% and 2.9% among young and adult birds. Similarly, Dakpogan and Salifou (2013) revealed that mortality rate is usually high in young chicks, because most of the Eimeria species affects birds between the ages of 3-18 weeks. On the other hand, incidence of egg-bound condition, ascaridiasis and vent pecking found to be highest in adults. Overall, grower (43.99%) showed significantly (p<0.05) higher mortality than layer (30.42%) and starter (25.58%) (Table 3). Coccidiosis (70.23%) was a major killer among grower birds. Besides it chilling, ascaridiasis and enteritis were other major diseases causing mortality.

Table 3: Age wise mortality (%) due to different diseases among different poultry stock

Diseases/Age	0-42days	43-126days	>127days
Coccidiosis	22.79 (49)	70.23 (151)	6.98 (15)
Enteritis	21.79 (17)	38.46 (30)	39.74 (31)
Chilling	66.18 (45)	29.41 (20)	4.41 (3)
Ascardiasis	7.57 (5)	40.91 (27)	51.51 (34)
Egg blockage	0 (0)	0 (0)	100 (63)
Omphalitis	53.57 (30)	41.07 (23)	5.35 (3)
Vent pecking	19.35 (6)	38.71 (12)	41.93 (13)
Liver rupture	9.09 (2)	40.91 (9)	50.0 (11)
E. Coli	15.38 (2)	30.77 (4)	53.85 (7)
Non-Diagnostic	27.59 (8)	20.69 (6)	51.72 (15)
Total Mortality %	25.58 (164)	43.99 (282)	30.42 (195)

Values under bracket indicates number of dead birds

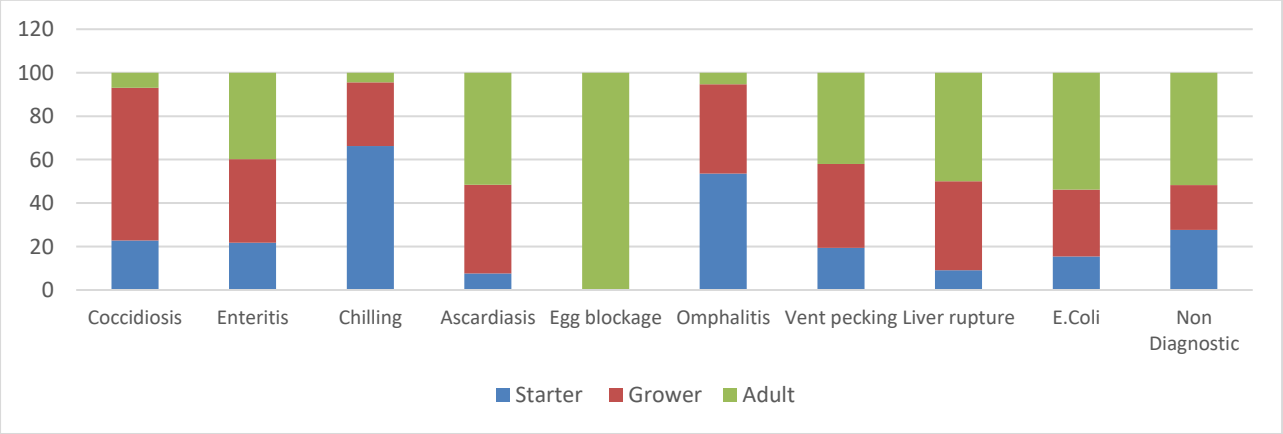

Figure 3: Age wise mortality percentage in DR, Native, DN and DND

Conclusion

The study assessed the seasonal analysis of diseases among various age groups of different poultry stock reared under intensive system. Incidence of coccidiosis (33.54%) followed by enteritis (12.16%), chilling (10.61%), ascaridiasis (10.29%) and egg blockage (9.82%) were observed as important cause of mortality in the population under study. Seasonal analysis revealed that the difference in mortality during rainy & winter was significantly (p<0.05) higher than the summer season. Overall mortality percentage was found to be higher in rainy (41.49%), than winter (34.32%) and least during summer season (24.18%). Age wise analysis revealed that chilling and omphalitis were major cause of mortality in starter birds and coccidiosis was more prevalent in grower stock and grower are more vulnerable to coccidiosis than the layer stock. Egg bound condition followed by ascaridiasis and

vent pecking were major causes of mortality in adult birds. Based on the study, suitable disease specific prevention measures are required to minimize the losses among various categories of poultry breeding stock reared under similar conditions.

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Conflict of Interests

There is no conflict of interest.

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