

Original Research Article

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## Evaluation of Economic Losses due to Coccidiosis in Layer Birds in Tarai Region of Uttarakhand

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### ABSTRACT

#### Keywords

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#### Article Info

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Economic impact assessment due to coccidiosis was conducted in commercial layer farms during the period from June, 2015 to January, 2016. A total of 6 poultry farms which were screened for coccidiosis, 3 layer farms (L1, L2 and L3) were found to be positive and among these 3 farms, in farm L1 and L2 no subclinical form of coccidiosis was recorded with maximum economic loss being due to mortality followed by chemotherapy and chemoprophylaxis. While in farm L3, no chemoprophylactic drug was used with maximum loss due to chemotherapy cost followed by loss in egg production and mortality. Vaccination was not used in any of the layer flocks.

### Introduction

In India, poultry production exists in both traditional extensive system of backyard farming as well as modern intensive system. Ministry of Food Processing Industries mentioned that, both organized and unorganized poultry sectors contribute 70% and 30%, respectively, with chicken followed by ducks being the two most popular species dominating with more than 99% to the total poultry production, while other avian species like guinea fowl, geese, quails, pea fowl, etc.

account for less than 1% (Jadhav and Nikam, 2014). In spite of the fact that coccidiosis is probably the most frequently reported disease in chicken worldwide (Biggs, 1982), there are many hurdles in arriving at a trusted figure for the specific financial losses and thus there are only occasional reports on the economic losses of poultry due to coccidiosis (Oyekole, 1984; Braunius, 1987; Graat, 1996). The estimation of economic losses by different countries differs because of the variability in factors included in the study and very few estimates are available for India.

## **Materials and Methods**

### **Type of bird considered for the calculation**

Commercial layer flocks positive for poultry coccidiosis were considered for the assessment of economic loss.

### **Data collection**

Records of the commercial poultry farms were analysed for the value of major inputs and outputs and were supplemented with questionnaire designed to obtain additional information from poultry farmers.

### **Lifespan of birds**

Lifespan for commercial layer life span was taken as 72 weeks.

### **Overhead cost**

Overhead cost of bird was assumed as per prevailing rates. It consisted of electricity, management and labour cost excluding the cost of chick and feed.

### **Market value of day old chick (DOC), poultry meat and eggs**

The market price of chicks for commercial layer and egg were taken as per prevailing rates mentioned in farm records and were further supplemented by NECC (National Egg Coordination Committee) and [www.Poultrybazaar.com](http://www.Poultrybazaar.com).

### **Anti coccidial vaccine**

The cost of each dose was taken as per prevailing rates mentioned in farm records (if used).

### **Feed requirement and cost**

The cumulative feed requirement (kg/bird) for commercial layer was taken. Cost of feed was

taken as per prevailing rates mentioned in farm records.

### **Economic models**

The model developed by Williams (1999) to estimate the losses due to poultry coccidiosis were used in the study with slight modification as required.

### **Commercial layer**

The major economic parameters which were estimated for commercial layer were

### **Vaccination**

Birds kept in deep litter system for first 16 weeks and then transferred to the cage system in those cases birds are to be vaccinated and the model for calculation was:

$$CV (\text{cost of vaccination}) = NBV \times CV$$

NBV= no. of birds vaccinated

CV= cost of vaccine per dose

### **Chemoprophylaxis**

Commercial layer reared under cage system do not require prophylaxis. But, in some of the farms birds also maintained in deep litter system where chemoprophylaxis is required and the economic model for commercial layer was:

$$TCCP (\text{total cost of chemoprophylaxis}) = N \times CFR \times MU \times CM$$

N= no. of birds placed

CFR= cumulative feed requirement for each bird (ton)

MU= medicine used, kg /ton of feed

CM= cost of medicine (Rs/kg)

### **Chemotherapy**

The occurrence of clinical coccidiosis in commercial layer is not uncommon. The economic model used was:

TCCT (total cost of chemotherapy) =  
 $NTB \times RW \times 2 \times (M1 + M2) \times CM$

NTB= number of treated birds

RW= requirement of water, L/day/bird

M1= medicine mixed with water in first half of treatment, kg/L

M2 = medicine mixed with water in second half of treatment, kg/L

CM= cost of medicine in Rs/kg

\*Modified as per the drug used

### Egg production loss

The model for egg production loss was:

TLEP (Total loss due to reduced egg production) =  $[NEH \times CEH] + [NET \times CET]$

NEH= no. of hatching egg loss

CEH=cost of single hatching egg

NET=no. of table egg loss

CET=cost of single table egg

### Loss due to mortality

The model for economic calculation was:

LM (loss due to mortality) =  $BDL \times [VCL + CFL + OC]$

BDL= no. of layer birds died

VCL= value of layer chick

CFL= cost of cumulative feed

### Results and Discussion

A total of 6 layer farms were screened during the study period out of which 3 farms were confirmed to be positive for coccidiosis and to evaluate the economic loss in the positive farm, a questionnaire survey was done which was further supplemented with the farm records available (Table 1). Based on these economic loss occurred in the farm was calculated. The details of the layer farms are given in Table 2.

#### Name of farm: Poultry farm (L1)

1. TCCP (total cost of chemoprophylaxis) =  
 $N \times CFR \times MU \times CM$

$$= 1200 \times 0.00085 \times 0.5 \times 300$$

$$= \text{Rs } 153$$

2. TCCT (total cost of chemotherapy) =  
 $NTB \times RW \times 5 \times (M1 + M2) \times CM$

$$= 1100 \times 0.3 \times 5 \times 0.001 \times 1325$$

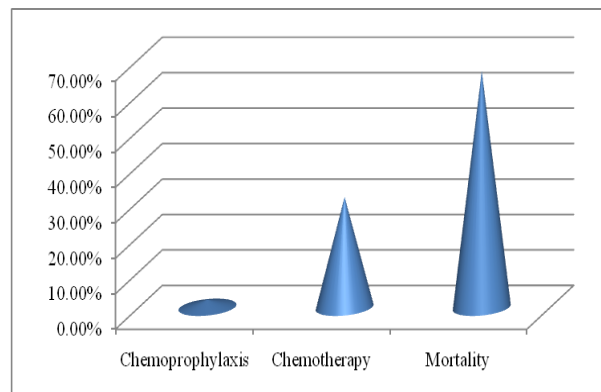
$$= \text{Rs } 2186$$

3. LM (loss due to mortality) =  $BDL \times (VC + CCF + OC)$

$$= 110 \times (22 + 17.50 + 3.00)$$

$$= \text{Rs } 4675$$

Total economic loss assessed =  
 $153 + 2186 + 4675 = \text{Rs } 7014$



#### Name of farm: Poultry farm (L2)

1. TCCP (total cost of chemoprophylaxis) =  
 $N \times CFR \times MU \times CM$

$$= 600 \times 0.001 \times 0.5 \times 200$$

$$= \text{Rs } 60$$

2. TCCT (total cost of chemotherapy) =  
 $NTB \times RW \times 5 \times (M1 + M2) \times CM$

$$= 536 \times 0.350 \times 5 \times 0.002 \times 1350$$

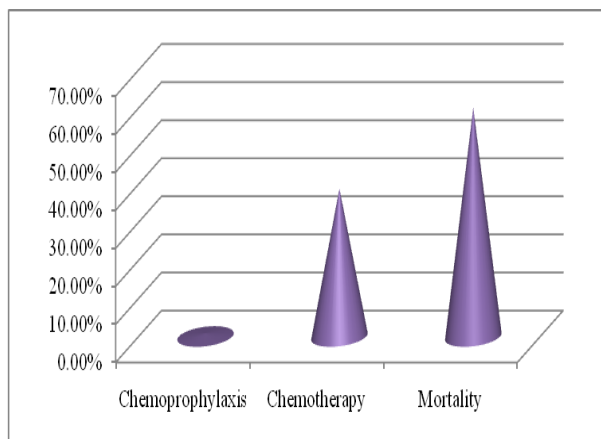
$$= \text{Rs } 2533$$

3. LM (loss due to mortality) =  $BD \times (VC + CCF + OC)$

$$= 84 \times (25 + 18 + 3.50)$$

$$= \text{Rs } 3906$$

Total economic loss assessed =  $60 + 2533 + 3906 = \text{Rs } 6499$



**Name of the farm: Poultry farm (L3)**

TCCP (total cost of chemoprophylaxis) =  $N \times CFR \times MU \times CM$

$$= 4100 \times 0.012 \times 0$$

$$= \text{Rs } 0$$

2. TCCT (total cost of chemotherapy) =  $NTB \times RW \times 5 \times (M1 + M2) \times CM$

$$= 4040 \times 0.825 \times 5 \times 0.001 \times 1470$$

$$= \text{Rs } 24,498$$

3. LM (loss due to mortality) =  $BD \times (VC + CCF + OC)$

$$= 70 \times (23 + 15.25 + 33.75)$$

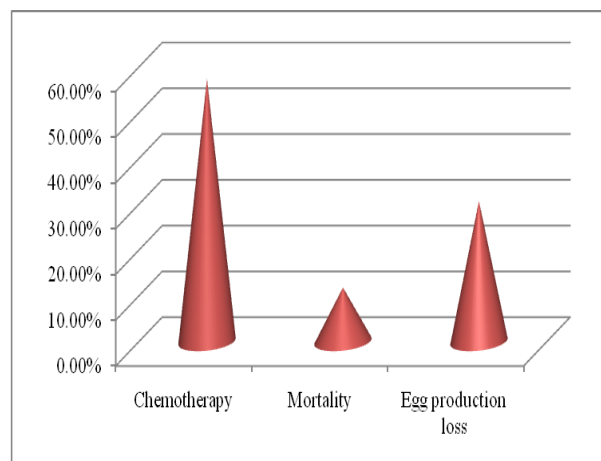
$$= \text{Rs } 5040$$

4. TLEP (total loss due to reduced egg production) =  $[NEH \times CEH] + [NET \times CET]$

$$= 0 + [4030 \times 3.25]$$

$$= \text{Rs } 13,098$$

Total economic loss assessed =  $0 + 24498 + 5040 + 13098 = \text{Rs } 42,636$



**Table.1** Major parameters considered for estimation

S. no.	Parameters for Layer
1.	Chemoprophylaxis cost
2.	Cost of chemotherapy
3.	Loss due to mortality
4.	Egg production loss
5.	Vaccination cost

**Table.2** Data collected from commercial layer flock

Name of the Farm	Poultry Farm (Uttarkashi)	Poultry Farm (Pantnagar)	Poultry Farm (Khatima)
Code no.	<b>Farm L1</b>	<b>Farm L2</b>	<b>Farm L3</b>
<b>Flock Strength</b>	1200	600	4100
<b>CFR (Tonne/bird)</b>	0.00085	0.0010	.011
<b>Chemoprophylactic Drug Used</b>	Nicarbazine+ Maduramycin	DOT	-
<b>Dose (Kg/ton of feed)</b>	0.500	0.500	-
<b>Cost of Medicine (Rs/kg)</b>	300	200	-
<b>No. of Treated Birds</b>	1100	536	4040
<b>Water Requirement (Lit/day/bird)</b>	0.300	0.350	0.825
<b>Total Mortality</b>	110	84	70
<b>Chemotherapeutic Drug Used</b>	Amprolium	Amprolium	Amprolium+ sulfaquinoxaline
<b>Cost of Medicine (Rs/kg)</b>	1325	1350	1470
<b>No. of table egg loss</b>	-	-	4030
<b>Cost of single table egg (Rs)</b>	-	-	3.25
<b>Value of layer chick (Rs)</b>	22	25	23
<b>Overhead Cost (Rs)</b>	3.00	3.50	15.25
<b>Cost of cumulative feed (Rs)</b>	17.50	18.00	33.75

**Table.3** Assessment of economic loss in commercial layer flock

Economic Parameters (Rs)	Farm Code		
	<b>L1</b>	<b>L2</b>	<b>L3</b>
Vaccination	-	-	-
Prophylaxis	153 (2.18%)	60 (0.92%)	-
Chemotherapy	2186 (31.16%)	2533 (38.9%)	24498 (57.45%)
Mortality	4675 (66.65%)	3906 (60.1%)	5040 (11.82%)
Egg production loss	-	-	13,098 (30.72%)
<b>Total loss</b>	<b>7,014</b>	<b>6,499</b>	<b>42,636</b>

In the present study, it was observed that in case of layers in farm L1 and L2, no subclinical form of coccidiosis and maximum loss occurred due to mortality followed by chemotherapy and prophylaxis. While, in farm L3 no prophylactic drug was mixed in feed and majority of loss was due to cost of chemotherapy, followed by loss in egg production and mortality. No vaccination was administered in any of the layer flocks. The further details are represented in Table 3.

Kinung'hi *et al.*, (2004) studied that coccidiosis caused losses were due to mortalities, coccidiostat costs, reduced weight gain and market value and reduced egg production in layers. In case of farm L1 and L2 in which no subclinical form was observed maximum loss occurred due to mortality and this coincides with the observation made by Kinung'hi *et al.*, (2004) and the reason could be the presence of more clinical form as compared to other farms. While in case of L3 the present study contraindicated the observation made by Bera *et al.*, (2010) that maximum losses occur due to chemoprophylaxis cost and loss of egg production. This variation may be due to the fact that in the studied farm (L3) no chemoprophylactic drug was administered and also due to the fluctuating costs of different commodities from those assumed by Bera *et al.*, (2010).

In conclusion, based on the assessment of economic impact due to coccidiosis in commercial layer farms it was observed that layer farms incurred significant economic losses with major losses due to mortality, chemotherapy and chemoprophylaxis in farms in which no subclinical form of coccidiosis was recorded (L1 and L2). While in farm L3, subclinical coccidiosis was observed with major loss due to chemotherapeutic cost, loss in egg

production and mortality. Prevention of coccidiosis via vaccination was not followed in any of the coccidiosis affected farms.

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