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Characterisation of Contract and Non Contract Broilers Farming in Eastern Plain Zone of Uttar Pradesh

Santosh Kumar Singh[1], H.C. Verma[2], Subodh Kumar[3], Mustak Ahamad[4], Amit Kumar[5]

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Abstract

The present study was carried out in the state of Uttar Pradesh. The state was purposively selected because, broiler farming in Uttar Pradesh as already discussed is in developing stage as compared to southern, western and other north Indian states like Punjab, Haryana etc. There is a substantial gap in demand and supply of poultry meat and table eggs. Uttar Pradesh being the most populous state and having large Muslim population has huge potential for growth of poultry sector. The Eastern Plain Zone was selected purposively due to highest poultry population among all other zones. The Eastern Plain Zone comprises of 12 districts namely Ambedkarnagar, Azamgarh, Ballia, Barabanki, Chandauli, Faizabad, Ghazipur, Jaunpur, Mau, Sant Ravidas Nagar, Sultanpur and Varanasi. For the present study, three districts viz. Sultanpur, Amethi and Pratpagarh were selected purposively out of 12 districts, on the basis of poultry population. Two blocks Mahrajganj and Bilariyaganj from Azamgarh district and another two Kashi Vidyapeeth and Pindra from Varanasi district were selected, purposively on the basis of poultry population and intensity of contract broiler farmers. From each block, two lists, one of contract broiler farmers and other of non-contract broiler fanners were prepared. From each list 10 contract and 10 non-contract poultry farmers having at least 2000 birds and two years of experience in poultry farming were selected randomly. Thus from each block 20 farmers (10 contract and 10 non-contract) were selected which make the total sample size of 120 broiler farmers (60 contract and 60 non-contract)

Keywords: Comparative study; Contract farming; On-contract farming; Poultry farmers.

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INTRODUCTION

The poultry farming in India occupies an important position due to its enormous potential to bring about rapid economic growth, particularly benefiting the weaker section due to its low investment requirement and short gestation period. The poultry, which was considered as a backyard proposition in the early 60's has now been transformed into a strong ago based commercial activity having tremendous employability and income generation potential. The poultry sector in the country during the last ten years (2003-2013) APEDA (2013)[2] has witnessed cyclic boom and burst phenomena due to accelerating factors such as high demand for poultry products as a result of overall economic growth and consequent rise in income, investments from multi-national food giants, disintegrating joint family system leaving limited scope for home cooking etc. on one hand, and decelerating factors such as high feed cost due to instable supplies of agro feed ingredients, emergence of deadly poultry diseases and resultant distortions in domestic as well as global poultry trade, limited investments in poultry infrastructure and more recent economic factors such as high inflation and ever rising cost of energy /fuel etc. on another hand.

MATERIALS AND METHODS

A study was carried out in the state of Uttar Pradesh. The state was purposively selected because, broiler farming in Uttar Pradesh as already discussed is in developing stage as compared to southern, western and other north Indian states like Punjab, Haryana etc. Uttar Pradesh being the most populous state and having large Muslim population has huge potential for growth of poultry sector. The Eastern Plain Zone was selected purposively due to highest poultry population among all other zones. The Eastern Plain Zone comprises of 12 districts namely Ambedkarnagar, Azamgarh, Ballia, Barabanki, Chandauli, Faizabad, Ghazipur, Jaunpur, Mau, Sant Ravidas Nagar, Sultanpur and Varanasi. For the present study, three districts viz. Sultanpur, Amethi and Pratpagarh were selected purposively out of 12 districts, on the basis of poultry population. Two blocks Mahrajganj and Bilariyaganj from Azamgarh district and another two Kashi Vidyapeeth and Pindra from Varanasi district were selected, purposively on the basis of poultry population and intensity of contract broiler farmers. From each block, two lists, one of contract broiler farmers and other of non-contract broiler fanners were prepared. From each list 10 contract and 10 non-contract poultry farmers having at least 2000 birds and two years of experience in poultry farming were selected randomly. Thus from each block 20 farmers (10 contract and 10 non-contract) were selected which make the total sample size of 120 broiler farmers (60 contract and 60 non-contract).

RESULTS AND DISCUSION

Housing Management Practices of Poultry Farmers

Table 1 revealed that the majority 58.3 percent of the contract poultry farmers had medium level of housing management practices followed by high (41.7%) and low (0.0%) respectively. Where as in case of non contract poultry farming also majority 78.3 percent of the non-contract poultry farmers had medium level of adoption of housing management practices followed by high (21.7%) and low (0.0%) respectively. Then overall majority 68.3 percent of the poultry farmers had medium level of adoption of housing management practices followed by high (31.7%) and low (0.0%) respectively in both contract and non contract poultry farming. This table reveals that the Medium level of adoption of housing management practices followed by high in both contract and non contract poultry farming found in the research area. Ahmad *et al.*(2018)[1] also reported the similar finding.

Table 1: Distribution of poultry farmers according to their housing management practices.

Housing management practices	Contract broiler farming	Non-contract broiler farming	Pooled
	(n=60)	(n=60)	(n=120)
Low	0 (0.0)	0 (0.0)	0 (0.0)
Medium	35 (58.3)	47 (78.3)	82 (68.3)
High	25 (41.7)	13 (21.7)	38 (31.7)

Values in the parenthesis indicate percentage.

Brooding Management Practices of Poultry farmers

Table 2 showed that the majority 70 percent of the contract poultry farmers had medium level of adoption of brooding management practices followed by high (30.0%) and low (0.0%) respectively. Where as in case of non contract poultry farming also majority 66.7 percent of the non-contract poultry farmers had medium level of adoption of brooding management practices followed by high (33.3%) and low (0.0%) respectively. Then overall majority 68.3 percent of the poultry farmers had medium level of adoption of brooding management practices followed by high (31.7%) and low (0.0%) respectively in both contract and non contract poultry farming. This table reveals that the Medium level of adoption of brooding management practices followed by high in both contract and non contract poultry farming found in the research area. Bhimraj *et al.*(2017)[4] also reported the similar finding.

Table 2: Distribution of poultry farmers according to their brooding management practices.

Brooding management practices	Contract broiler farming (n=60)	Non-contract broiler farming (n=60)	Pooled (n=120)
Low	0 (0.0)	0 (0.0)	0 (0.0)
Medium	42 (70.0)	40 (66.7)	82 (68.3)
High	18 (30.0)	20 (33.3)	38 (31.7)

Values in the parenthesis indicate percentage.

Feeding Management Practices of Poultry Farmers

Table 3 revealed that the majority 76.7 percent of the contract poultry farmers had high level of adoption offeeding management practices followed by medium (23.3%) and low (0.0%) respectively. Where as in case of non contract poultry farming also majority 58.3 percent of the non-contract poultry farmers had medium level of adoption of feeding management practices followed by high (40%) and low (0.0%) respectively. Then overall majority 58.3 percent of the poultry farmers had level of high adoption of feeding management practices followed by medium (40.8%) and low (0.8%) respectively in both contract and non contract poultry farming. This table reveals that the high level of adoption feeding management practices in contract poultry farming while medium level adoption feeding management practices in non contract poultry farming found in the study area. Babu, P.(2013)[3] also reported the similar finding.

Table 3: Distribution of poultry farmers according to their feeding management practices

Feeding management practices	Contract broiler farming (n=60)	Non-contract broiler farming (n=60)	Pooled (n=120)
Low	0 (0.0)	1 (1.7)	1 (0.8)
Medium	14 (23.3)	35 (58.3)	49 (40.8)
High	46 (76.7)	24 (40.0)	70 (58.3)

Values in the parenthesis indicate percentage.

Health Care Management of Poultry Farmers

In Table 4 revealed that the majority 65 percent of the contract poultry farmers had high level of adoption of health care management practices followed by medium (33.3%) and low (1.7%) respectively. Where as in case of non contract poultry farming also majority 85 percent of the non-contract poultry farmers had medium level of adoption of health care management practices followed by high (13.3%) and low (1.7%) respectively. Then overall majority 59.2 percent of the poultry farmers had level of high adoption of feeding management practices followed by medium (39.2%) and low (1.7%) respectively in both contract and non contract poultry farming. This table reveals that the high level of adoption health care management practices in contract poultry farming while medium level adoption health care management practices in non contract poultry farming found in the study area. Ahmad *et al.*(2018)[1] also reported the similar finding.

Table 4: Distribution of poultry farmers according to their health care management.

Health Care Management	Contract Broiler Farming (n=60)	Non-contract Broiler Farming (n=60)	Pooled (n=120)
Low	1 (1.7)	1 (1.7)	2 (1.7)
Medium	20 (33.3)	51 (85.0)	71 (59.2)
High	39 (65.0)	8 (13.3)	47 (39.2)

Values in the parenthesis indicate percentage.

CONCLUSION

Then overall majority 68.3 percent of the poultry farmers had medium level of adoption of housing management practices followed by high (31.7%) and low (0.0%) respectively in both contract and non contract poultry farming. Majority 70 percent of the contract poultry farmers had medium level of adoption of brooding management practices followed by high (30.0%) and low (0.0%) respectively. Where as in case of non contract poultry farming also majority 66.7 percent of the non-contract poultry farmers had medium level of adoption of brooding management practices followed by high (33.3%) and low (0.0%) respectively.

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Conflict of Interest:

None of conflict

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Foliicolous Fungi on Some Important Ethano Medicinal Plants from Katarniaghat Wildlife Sanctuary Bahraich (U.P.) India

Ajay Kumar[1], Rajiv Ranjan[2]

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Abstract

The Katarniaghat Wildlife Sanctuary is a protected area in the Upper Gangetic plain, near Bahraich city in Bahraich district of Uttar Pradesh, India and covers an area of 400.6 km^2 (154.7 sq mi) in the Terai of the Bahraich district. In 1987, it was brought under the purview of the 'Project Tiger', and together with the Kishanpur Wildlife Sanctuary and the Dudhwa National Park it forms the Dudhwa Tiger Reserve. It was established in 1975.

The Katerniaghat Forest provides strategic connectivity between tiger habitats of Dudhwa and Kishanpur in India and the Bardia National Park in Nepal. Its fragile Terai ecosystem comprises a mosaic of sal and teak forests, lush grasslands, numerous swamps and wetlands.

Keeping this in mind the authors surveyed with thirty-nine Angiospermic host plants representing thirty-nine genera and twenty families being parasitized by forty fungal species representing thirty-fungal genera.

Keywords: Foliicolous fungi; Katarniaghat Wildlife Sanctuary Bahraich; Ethanomedicinal Plants; U.P.

INTRODUCTION

The leaves provide a very suitable habitat for the growth and development of fungal pathogen by providing ample surface area and nutrient supply. Such leaf inhabiting fungi are known as foliicolous fungi and the invaded area of the leaf appears as leaf spot or leaf lesion. The weed and forest plants serve as reservoir of leaf spot pathogen which on getting opportunity may spread to agriculture & horticulture plants.

India is the one of the twelve mega biodiversity countries of the world, has two of the worlds eighteen biodiversity hot spots located in the Western ghats and in the Eastern Himalayas. In north the Himalayas rise as a virtual wall beyond the snow line. Above the alluvial plain lies the Tarai strip, a seasonally marshy zone of sand and clay soils. Since Katarniaghat Wildlife Sanctuary Bahraich belongs to Northern Tarai Region which has higher rainfall than the plains, and the downward rushing rivers of the Himalayas slow down and spread out

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in the flatter Tarai zone depositing fertile silt and reproductive means during the mansoon season and receding in the dry season. The Tarai, as a result has high water level and is characterized by moist sub-tropical conditions and a luxuriant turnover of green vegetation all the year around. The climatological and topographical conditions favor the luxuriant growth and development of foliicolous fungi. Katarniaghat Wildlife Sanctuary Bahraich which represents a part of North Tarai Region of U.P. is next only to Eastern and Western ghats, as one of the hottest spots for Biodiversity in general and the diversity of fungal organism inhabiting plant leaves in particular offers an ideal opportunity for the morpho taxonomic exploration of fungal organism in general and foliicolous fungi in particular.

In Katarniaghat Wildlife Sanctuary there are many ethanomedicinal plants. Keeping it in view, the authors surveyed the locality of Katarniaghat Wildlife Sanctuary Bahraich during April 2020 to February, 2023.

MATERIALS AND METHODS

During collection, infected leaf samples were taken in separate polythene bags. Suitable mounts of surface scrapping and hand cut sections were prepared from infected portions of the leaf samples. Slides were prepared in cotton blue lactophenol mixture & were examined. Camera Lucida drawing were made and the morpho-taxonomic determination of taxa was done using available literature and with the help of resident's expertise available. All the fungal taxa were identified using microscopic preparation. The fungal holotype specimen accession number has been allotted from TFRI, M.P.

OBJECTIVE OF THE STUDY

The Foliicolous Fungi causes huge losses every year in different parts of the world. The fungal pathogens producing leaf spots infect a large variety of hosts including most of the crops, forests and other plants. The destruction caused by these enemies of leaves is a serious problem before us. The focus of this research is identification & documentation of foliicolous fungi which will assist in the discovery of new fungicides and ideas to overcome from the severity of these enemies of nature as well as in the protection of floral diversity from the infection of these pathogens and also in the conservation of valuable flora of the area.

RESULTS AND DISCUSSION

The authors surveyed periodically the diversified habitats of Katarniaghat Wildlife Sanctuary, Bahraich during April, 2020 to February, 2023 so as to collect and document Foliicolous fungi. The authors collected thirty-nine Angiospermic host plants representing thirty-nine genera and twenty families being parasitized by forty fungal species representing thirty-fungal genera.

The Host Plants and their Parasites are Listed below:

The literature Bilgrami *et al.*[1,2,3], 1979, 1981, 1991; Carmichael *et al*.[4], 1980; Ellis[5] 1971, 1976; Ellis and Ellis[6,7,]

1.	*Ficus benghalensis* Linn. (Moraceae)	*Cercosporafici* Heald & Wolf
2.	*Dalbergia sissoo* Roxb. (Fabaceae)	*Thermomyces leguminosus* Tsiklinsky
3.	*Clerodendrum inerme* (L.) Gaertn. (Verbenaceae)	*Phyllosticta inermis* Pandotra & Ganguly
4.	*Clerodendrum infortunatum* Vent. (Verbenaceae)	*Cercospora volkemeriae* Speg.
5.	*Rosa indica Linn.* (Rosaceae)	*Alternaria dianthi* Stev. & Hall.
6.	*Eucalyptus globules* Labill. (Myrtaceae)	*Muragenella eucalypti* Sutton & Sharma
7.	*Eucalyptus lanceolatus* Linn. (Myrtaceae)	*Pestalotiopsis glandicola* (Cast) Stey
8.	*Pongamia pinnata* Vent. (Fabaceae)	*Corynespora pongamicola* Singh & Mall
9.	*Canna indica* Linn. (Cannaceae)	*Cercospora cannae* Kar & Ray
10.	*Borassus flabellifer* Linn. (Arecaceae)	*Phomaballiensis* Srivastava *Sphaerophragmiumdal bergiae* Diet.
11.	*Tenospora malabarica* Miers. (Menispermaceae)	*Atractillina parasitica* (Wint.) Deighton & Pirozynski
12.	*Mangifera indica* Linn. (Anacardiaceae)	*Meliolafragilis* Hansf.

table cont....

13.	*Clerodendrum viscosum* Linn. (Verbenaceae)	*Cercospora clerodendri* Miyake
		Meliola clerodendricola Henn.
14.	*Mallotus philippensis* Muell. (Euphorbiaceae)	*Pestalotiopsisadusta* Ell. & Ev.
15.	*Tectona grandis* Linn. (Verbenaceae)	*Corynespora cassiicola* (Berk & Curt) Wei.
16.	*Tamarindus indica* Linn. (Fabaceae)	*Hypoxylonnectriodes* Speg.
17.	*Androgaphis peniculata* (Brum. f.) Wall ex Nees (Acanthaceae)	*Cercospora andrographidis* Thirumalachar & Govindu
18.	*Ocimum sanctum* Linn. (Lamiaceae)	*Cercospora osmicola* Petrak & Ciferri
		Corynespora cassiicola (Berk & Curt) Wei.
19.	*Ficusreligiosa* Linn. (Moraceae)	*Drechslera colocaceae* Tandon & Bhargava
20.	*Saracaindica* Linn. (Fabaceae)	*Corynespora cassiicola* (Berk & Curt) Wei.
21.	*Dalbergiasissoo* Roxb. (Fabaceae)	*Thaxteriaphaeo stroma* (Dur. & Mont.) Booth
22.	*Agave tequillana* Linn. (Asparagaceae)	*Cercospora agavicola* Ayala
23.	*Justiciabrandegeana* Linn. (Acanthaceae)	*Asteridiella justiciae* Hosag. & Rajkumar
24.	*Viciafaba* Linn. (Fabaceae)	*Cercospora zonata* Wint.
25.	*Murrayakoenigii* (L.) Sprengel (Rutaceae)	*Meliola eugeniae* Hanf.
26.	*Agave tequillana* Linn.	*Alternaria tenuis* Nees
	(Asparagaceae)	*Drechslera ravenelii* (Curt.) Subram. & Jain
27.	*Panicum maximum* Linn. (Poaceae)	*Alternaria tenuis* Nees
28.	*Caryotaurens* Linn. (Arecaceae)	*Ascochyta caryotina* Rao
29.	*Caladium bicolor* (Aiton) Vent (Araceae)	*Alternaria alternata* (Fr.) Keissler
30.	*Elettaria cardamomum* (L.) Maton (Zingiberaceae)	*Periconia byssoides* Pers. ex Meral
		Corynespora cassicola (Berk & Curt) Wei.
31.	*Mirabilis jalapa* Linn. (Nyctaginaceae)	*Periconia byssoides* Pers. ex Meral
32.	*Azadirachtaindica* Linn. (Meliceae)	*Pseudocercospora meliae* Rai & Kamal
		Alternaria dianthi Stev. & Hall.
33.	*Jasminum sambac* (L.) Aiton (Oleaceae)	*Glomerella cingulata* (Stonem.) Spould & Shrenk.
		Phomopsis pavgi Shukla
34.	*Ocimum sanctum* Linn. (Lamiaceae)	*Alternaria solani* Sorauer
35.	*Crinum latifolium* Linn. (Amaryllidaceae)	*Myxocyclus polycistis* Ellis & Ellis
36.	*Prosopis spicigera* Linn. (Mimosaceae)	*Morenoina clarkia* Ellis
37.	*Cucurbita maxima* Duchense (Cucurbitaceae)	*Drechslera halodes* (Dreschs.) Subr. & Jain
38.	*Croton roxburghii* Bat. (Euphorbiaceae)	*Alternaria crotonis* Kamal
39	*Ficusvirens* Linn. (Moraceae)	*Alternaria alternata* (Fr.) Keissler

1997; Hosagaudar *et al.*[8,9], 1996, 2006; Jamaluddin *et al.*[10], 2004; Mukerji *et al.*[19], 1974; Sarbhoy *et al.*[22,23], 1986, 1996; Singh and Mall[24], 2007; Verma *et al.*[27], 2008; Mall[15,16,17], 2011 a, b, Parmar *et al.*[20], 2012; Kumar and Mall[12-14], 2012, 2013, 2015; Mall[18], 2015 a, b, Rani *et al.*[21], 2015; Tripathi *et al.*[26], 2016; Singh *et al.*[25], 2020; Jain Mary Jose *et al.*[11], 2023 reveals that the fungal texa mentioned above are hitherto unexplored from Katarniaghat Wildlife Sanctuary, Bahraich. Hence are the new records for Indian mycoflora from Katarniaghat Wildlife Sanctuary, Bahraich U.P.

CONCLUSION

Foliicolous fungi have attracted the attention of Mycologists since the very beginning of Mycology, due to distinct and sometimes eye catching symptoms produced on the leaf surfaces and also due to their pathological importance. However, taxonomic studies of foliicolous fungal forms in general have been generally considered as only of Academic interest, although there is growing acceptance now that taxonomic treatment of a fungal organism is the prerequisite to any studies concerning its biology. By this we can develop many fungicides and control these diseases and also save our environment.

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Feeding and Managemental Strategies for Dairy Animals During Era of Climate Change

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Abstract

Animal environment is affected by climatic factors that include temperature, humidity, radiation and wind movement. Dairy animals generate heat from two sources viz. the environmental temperature and humidity, and their internal body metabolism and digestion. Within the thermo-neutral zone, the production and loss of heat from animal's body is about equal. Within this zone, animals are able to maintain a normal body temperature of 38.5-39.3°C relatively easily. When more heat accumulates than the animal can dissipate, heat stress occurs. Extreme climatic conditions can alter energy transfer between the animal and its environment and might have deleterious effect on growth, production and reproduction in dairy animals. Animals mostly suffers from heat stress condition so warm & humid climatic conditions are highly detrimental effects on animals performances. One of the major contributors of milk in India is buffalo and crossbred cattle, but they are highly susceptible to hot, humid and cold climate. To unwind the effect of climatic stress, the mechanism of thermoregulation takes place within the animal body to reduce the detrimental effects on reduced milk production, milk fat content, impaired reproductive performance and making the animal more susceptible to various health problems (Naqvi *et al*., 2012).[8] Feeding and management interventions in terms of nutritional modification, housing arrangement may curtail the adverse effect of climate change on growth, productive & reproductive performances in dairy animals. In Indian subcontinent, heat stress is the most important climatic stress. Heat stress adversely affecting productive and reproductive performance of livestock, and hence reducing the total area where high yielding dairy cattle may be economically reared. The livestock sector which will be a sufferer of climate change is itself a large source of methane emissions contributing about 18% of total enteric methane budget.

Keywords: Homeostasis; THI; TNZ; LCT; UCT and VFA.

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INTRODUCTION

Animal environment is affected by climatic factors that include temperature, humidity, radiation and wind movement. Thermoneutral zone is the range of environmental temperatures from lower critical temperature (LCT) to upper critical temperature (UCT) where normal body temperature is maintained and heat production is at the basal level (Singh *et al.*, 2014).[18] Thermoneutral zone depends on the age, breed, feed intake, diet composition, previous state of temperature acclimatization, production, housing and stall conditions, tissue (fat, skin) insulation and external (coat) insulation and the behaviour of the animal (Gaughan, 2015 and Singh *et al.*, 2008).[4,16] Dairy cattle experience heat stress or cold stress when environmental temperature is not within the thermoneutral zone and thereby there is a decrease in milk production under such stress conditions. The physiological responses of the animals maintained under open sky has elevated physiological parameters (Singh *et al.*, 2007 & 2009).[14,9] Moreover, high temperature and humidity alter the balance of endocrine profiles in dairy cattle, leading to lower intensity of estrous behavior, anestrus, embryonic death, and subsequent infertility (Bell *et al.*, 2011).[2] The bovine thermal comfort zone is -13ºC to 25ºC. Within this temperature range, the animal comfort is optimal, with a body temperature between 38.4ºC and 39.1ºC.

Effect of Climate change

Effects of heat stress in dairy animals are direct or indirect which include:

i. ***Feed intake decrease***: At the temperatures of 25-26ºC feed intake in dairy animal begins to decline and drops more rapidly above 30ºC. At 40ºC, dietary intake may decline by as much as 40%. Heat stress in high producing lactating dairy cows results in considerable reduction in appetite, roughage intake and rumination. This may be due to elevated body temperature and gut fill as these animals have a lower rate of feed passage and reduced gut motility (Singh *et al*, 2014a).[18] Heat stress affects rumen fermentation adversely and the total volatile fatty acid (VFA) production is decreased even when the feed intake is same. During heat stress, DMI (dry matter intake) or nutrient intake declines whereas nutrient requirement for maintenance and active cooling processes like panting increases (Singh *et al.*, 2007a).[19] Therefore, offering more forage to animals will cause more heat production in animal's body, adding on to the heat stress problem. On the other side blood flow to internal organs like the mammary gland is reduced delivering fewer nutrients to these organs for metabolism. Thus, fewer nutrients are available for milk production during heat stress. In case of dry cows, off-feed or decrease in DMI during the heat stress can lead to more health problems at parturition and potentially reduce milk production during the subsequent lactation.

Besides these the following impacts of heat stress on feed intake or digestion have been observed:

- Increased feed refusals
- Increased feed sorting
- Reduced natural buffering capacity due to reduced saliva production and increased carbon dioxide expiration
- Increased loss of minerals due to sweating, panting, and urination
- Increased metabolic disorders (acidosis)

Metabolism is reduced due to reduction in thyroid hormone secretion, plasma growth hormone concentration and secretion rate, ruminal pH and gut motility in heat stressed cattle. Major changes in dietary electrolyte balance (Na+, K+, CL^{-} and the buffer HCO_3^{-}) and acid/base balance associated with heat stress takes place.

ii. ***Water intake increase***: The total body water is estimated to range between 75 and 81% of the body weight for lactating dairy cows. Milk contains 87% water and large concentrations of the electrolytes Na, K, and Cl. Water and macro-mineral need increases heavily under heat conditions to maintain homeostasis and homeothermy. Under thermal stress cows tend to have increased water content in the rumen as a result of an accelerated water turnover rate. Moreover, there is need to compensate additional evaporative water loss. Heat stress increases water consumption by at least five times than normal level in temperate weather and three times more in tropical weather.

iii. ***Effect on the Milk yield & Composition:*** During hot and humid weather conditions, there is reduction in intake of the nutrients in dairy cow which are otherwise necessary for production of milk as well as for body maintenance. It has been established that reduction in milk yield during heat stress is mainly, due to less feed intake on one hand and increased maintenance requirement, which reduce feed efficiency on the other hand. Milk yield usually reduce 10-15%

or more during this period. The lactating cows are affected more with heat load due to increased metabolically derived heat associated with milk production, increased rate of respiration and rectal temperature leads to hyperthermia and milk production is reduced proportionately. This may also be explained by the negative effect of heat stress on the secretory function of the udder. There is reduction in daily output, lactation peaks, milk fat production, casein composition, milk component levels and increase in SCC levels. Similarly, higher environmental temperature during last three months of gestation alters blood flow and prolonged hyperthermia interferes with normal placental growth and endocrine function, which results in lower calf birth weight and hormonal alterations affect mammary development and lactogenesis. Reduced hormonal activity particularly T4 during pregnancy affects metabolic state of the dam at parturition and thus reduce mammary development prior to the initiation of lactation which ultimately leads to poor milk production.

The stage of lactation is also an important factor affecting dairy cows' responses to heat. Johnson *et al.* (1998) observed that the mid-lactating dairy cows were the most heat sensitive compared to their early and late lactating counterparts.[7] In fact, mid-lactating dairy cows showed a higher decline in milk production (−38%) when the animals were exposed to heat (Thoroton *et al.*, (2022) and Upadhyay *et al.* (2007) observed the extent of decline in milk yield were less at mid lactation stage than either late or early stage and decline in yield varied from 10-30% in first lactation and 5-20% in second or third lactation in Murrah buffaloes.[20,21] Milk production traits in ewes seem to have a higher negative correlation with the direct values of temperature or relative humidity than THI. The values of THI, above which ewes start to suffer from heat stress, seem to be quite different among breeds of sheep. Solar radiation seems to have a lesser effect on milk yield, but a greater effect on yield of casein, fat and clot firmness in the milk of ewes (Sejiana *et al.*, 2013).[10,11]

iv. ***Effect on Reproductive Efficiency:*** Adverse effects of heat stress on reproduction include reduction in estrous activity, estrous duration, heat detection, follicular development, oocyte quality, semen quality, conception rate, pregnancy rate, uterine function, multiple ovulations and twinning, suppressed intensity of oestrus, a reduction in the strength of the preovulatory LH surge, a decreased secretion of progesterone, altered follicular development, decreased embryo development as well as fetal growth and reduced fertility (Gaughan and Cawsell-smith, 2015).[4,5,6] It is clear that heat stress has many effects on the reproductive axis, some are direct effects on the hypothalamus, the anterior pituitary gland, the uterus, the follicle and its oocyte and the embryo itself; other effects are indirect, probably mediated by change in the metabolic axis in response to reduced dry matter intake.During this period, lower pregnancy rates occur either due to higher rate of fertilization failure or early embryonic death or low sperm output and poor semen quality due to inability of bull to maintain optimal scrotal and testicular temperature. Conception rate declined from 61 to 45% when rectal temperature 12 h post breeding increased 1°C.

Besides these some other impacts of heat stress on reproduction has been observed:

- Decreased uterine blood flow
- Increased embryonic death
- Reduced placental mass
- Reduced fetal tissue growth
- Reduced mammary tissue growth
- Early calvings
- Light, weak or dead calves
- Lower colostrum immunoglobulin (IgG)
- Lower colostrum protein, fat, and lactose
- Lower calf blood protein levels
- More "quiet heats"
- Unsynchronized ovulations
- Fertility failure
- Decreased growth, size and development of ovarian follicles
- Abortion and retained placenta cases are more for cows calving during the summer.
- Cows calving during hot months show longer calving to conception intervals, more services per conception
- Heat stress during the dry period may

alter the development of the placenta.

v. ***Oxidative Stress:*** Heat stress generally increases the production of free radicals, leading to oxidative stress. In dairy cows, oxidative stress has a negative impact on immune and reproductive functions: increased mastitis frequency and higher somatic cells counts in milk, decreased fertility, increased embryo mortality, post-partum retained placenta, and early calving, with consequences on the calves live weight, mortality and health.

vi. ***Effect on Health of Dairy cows:*** During hot and humid weather conditions, the animals become more vulnerable to diseases. There is an increase in the somatic cell counts (SCC) and a higher incidence of mastitis and increase in number of flies during summer aggravates the situation. There will be suppressed immune function, increased incidence of mastitis, increased chances of retention of placenta, higher ketone & NEFA levels at the time of calving and higher risk of acidosis, this is mainly due to decreased DM intake with lower proportion of forage and higher levels of fermentable carbohydrates, decrease in rumination, saliva in gut and buffering power due to increased CO_2 expelled. Additionally, the decreased rumen pH impairs fibers digestion efficiency as rumen fibrolytic bacteria is affected due to drop in rumen pH (below 6.0). Acidosis is found to affect the animals overall health status, fertility and longevity.

vii. ***Effect on Vectors:*** The epidemiology of many diseases are based on transmission through vectors such as ticks, lice, mites, mosquitoes and flies, the developmental stages of which are often heavily dependent on temperature and humidity. Changes in rainfall and temperature regimes may affect both the distribution and the abundance of disease causing vectors, as can changes in the frequency of extreme events (Thornton *et al.* 2009).[22] High temperature with high humidity and rainfall leads to the seasonality of Foot and Mouth (FMD) disease in cattle in hyper-endemic areas of India.

viii. ***Effect on Pathogens:*** Higher temperatures resulting from climate change may increase the rate of development of certain pathogens or parasites that have one or more life cycle stages outside their animal host. This may shorten generation times and, possibly, increase the total number of generations per year, leading to higher pathogen/parasite population sizes. Conversely, some pathogens are sensitive to high temperatures and their survival may decrease with climate warming. Pathogens and parasites that are sensitive to moist or dry conditions may be affected by changes to precipitation, soil moisture and the frequency of foods.

ix. ***Effects on hosts:*** Climate change may bring about substantial shifts in disease distribution, and outbreaks of severe disease could occur in previously unexposed animal populations (possibly with the breakdown of endemic stability) (Thornton *et al.* 2022).[22] Endemic stability occurs when the disease is less severe in younger than older individuals, when the infection is common or endemic and when there is lifelong immunity after infection. Certain tick-borne diseases of livestock, such as anaplasmosis, babesiosis and cowdriosis, show a degree of endemic stability (Basu *et al.*, 2004).[1]

x. ***Impact on bio-diversity:*** Climate has continue to change rapidlyleads to agricultural and farm communities will deteriorate further while we lose more genetic diversity among crops and farm animals, biodiversity will decline faster rate as terrestrial and aquatic ecosystems are damaged. Harmful exotic species will become ever more numerous.

Ameliorative Measures of heat stress Reduction

As discussed, heat stress is a burden for the cow's performance and health that costs the dairy industry millions every year. Implementation of herd management techniques as early as possible is beneficial at production level. In order to prevent the effects of heat stress, economically feasible heat stress relief techniques can be used which include the use of fans, shades, foggers, misters, desert coolers, air conditioners, water bathing and adequate air circulation. Modifications in feeding strategies by either dietary fiber adjustment or the use of high-quality forage, supplemental protected fat and feeding at cool hours can greatly help in reducing the negative effect of heat stress on productive and reproductive performance.

PHYSICAL PROTECTION

- ❖ Trees are an excellent natural source of shade on the pasture and cools the surrounding air.[13]
- ❖ Solar radiation is a major factor in heat stress can be blocked by use of properly constructed shade structures alone increases milk production remarkably. Two options are available: permanent shade structures and portable shade structures. Shade permits reduction of more than 30% of all the heat radiated on cattle and is the single most important contribution for lowering heat stress.[15,17]

Besides these some of the protective measures are

- ✓ Avoid overcrowding
- ✓ Do not keep the animals in the holding area for long time. The holding area is a very crowded and poorly cooled area in many farms.
- ✓ The air flow over the cow housing area should be 4-5 mph.

Air Temperature Reduction Measures

Air temperature of micro-environment can be lowered by air conditioning or refrigeration but the expenses of such types of air cooling make these impractical.[3] The evaporative cooling pad (corrugated cardboard or similar material) and a fan system which uses the energy of air to evaporate water is a more economically feasible method to cool the micro-environment. Several cooling measures may be utilized to get rid of heat stress are mentioned below:

- Fine mist injection apparatus
- The cooler at very high rates. This system is effective in arid climates.
- High pressure foggers
- Misters
- Cooling in hot and humid climates emphasizes shade, wetting the skin and forced drying of the cow's coat to maximize the cooling effect.
- Milking parlors with adequate holding pens can employ the use of subsequent sprinkling and forced air in the pens.
- In dairies with adequate drainage and housing, evaporative cooling can be provided above the feed bunks in addition to or instead of in the holding pen.
- Upper body sprinkling followed by forced air ventilation reduces body temperature, increase feed intake and milk yield.
- Sprayers in parlour exit lanes.

Nutritional Dietary Manipulation

Evaporative heat loss through sweating, frequent urination and panting is the primary mechanism for heat loss at high environmental temperatures. Besides this following manipulations in feed and feeding system can help to reduce the heat stress

- Increasing the amount of feed available during the cooler period of the day, early morning or late evening. Feeding 60 to 70 percent of the ration between 8 p.m. and 8 a.m. has successfully increased milk production during hot weather.
- Feeding fish meal as bypass protein.
- Increase the amount of concentrate by adding an energy rich feedstuff such as maize, or other cereal, and reduce the amount of fiber in the diet.
- Fat Supplementation
- Minimize drastic change in ration.
- During heat stress rumen degradable protein should not exceed 61 percent of CP.
- Management of the dietary electrolyte balance is based on adding essential body salts and electrolytes to the drinking water and feed.
- Adding water to diets may help DMI during summer months. Water will soften fiber feeds and reduce dustiness and dryness of the diet increasing palatability and DMI. A three to five percent addition of water is recommended.
- To reduce rumen acidosis high energy, more palatable diets, with high quality, highly palatable forages should be provided. On the other hand feeding of live yeast *Saccharomyces cerevisiae* CNCM I-1077, improves rumen pH as a result reduce acidosis risk, improve fiber digestion and nitrogen utilization, increased feed efficacy, help in rumen microflora stabilization and helps in milk production.
- A well balanced (Total mixed ration) TMR will allow diets to be formulated at minimum fiber levels encouraging DMI and minimizing rumen fermentation fluctuations and pH

declines.

- Use of anti-oxidants such as selenium enriched yeast (Alkosel® R397) help reducing the impact of heat stress on the oxidative balance, resulting in improved milk quality, immune and reproductive functions, prevention of retained placenta and reduced somatic cells.
- Vitamin A, Vitamin E, niacin and selenium should be supplemented in diet during this period. Sometimes zinc and biotin may also play important role.
- Provision of fresh and cooled water all the time is most important. Water tanks should be located close to the feeding area to encourage both DMI and frequent drinking.
- An increase in the levels of deficient nutrients sodium (0.4 to 0.5%, Sodium bicarb or Sodium sesquicarbonate), potassium (1.5%, potassium carbonate, potassium sulfate/magnesium sulfate and potassium chloride) and magnesium (0.3 to 0.35%, magnesium oxide, magnesium sulfate) and decrease in chloride (go down to .25-.30% in heat) may be helpful.

Besides the importance of providing shade, cooling measures and nutritional modification the following measures should also be taken into consideration as ameliorative measures.

- Reduce parlor walking distance.
- Reduce time in holding area.
- Improve ventilation.
- In areas of extreme heat, it is even more important for cows to give birth in good body condition because after parturition their dry matter intake will be lowered by heat stress, as well as the usual low intake immediately after calving.
- Fly control.
- Under these conditions dairy farmers must go for artificial insemination rather than using natural service of heat stressed bulls.
- Teat dipping with germicidal dips is recommended.
- Handling cattle can elevate their body temperature by as much as 3.5°F. Therefore avoid handling during intense heat.

CONCLUSIONS

Global demand for Animal products is expected to double by 2050, mainly due to improvement in the worldwide standard of living & scientific interventions in livestock rearing. Meanwhile, climate change is a threat to livestock production because of the impact on quality of feed crop and forage, water availability, animal and milk production, livestock diseases, animal reproduction, and biodiversity. Climate change is a major threat to the farming community as well as for the sustainability of livestock systems globally. Consequently, adaptation to, and mitigation strategies against the detrimental effects of extreme climates has played a major role in combating the climatic impact on livestock. As livestock is an important source of livelihood, it is necessary to find suitable solutions not only to maintain this industry as an economically viable enterprise but also to enhance profitability and decrease environmental pollutants by reducing the ill-effects of climate change.

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Case Report

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Diagnosis of Cryptorchidism in German Shepherd Dog using Ultrasonography & its Management

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Abstract

Present article reports the case of bilateral cryptorchidism in German shepherd dog and its diagnosis using manual palpation of scrotum, real time B-mode ultrasonography. Cryptorchidism is common congenital condition affecting overall reproduction, excessive sexual behaviour also can show some aggressive behaviour.

Keywords: Cryptorchidism; German Shepherd; Ultrasonography.

INTRODUCTION

Cryptorchidism is a common congenital pathology affecting reproduction and general behaviour of dogs. Majority of cases of cryptorchidism are observed in dogs but can also be observed in other animal species. The condition can be unilateral or bilateral, characterised by failure of descent of testis into scrotum from the abdominal cavity. Cryptorchidism is heritable and is a sex limited autosomal recessive trait in dogs (Johnson *et al.*, 2001).[1] The incidence seems to be higher in purebred and inbred dogs than in mixed breed dogs. High prevalence of cryptorchidism within lines of inbred Cocker Spaniels and miniature Schnauzers has been reported (Cox *et al.*, 1978) and (Pulling, 1953).[2,3]

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CASE HISTORY

A four-year-old German shepherd male dog was presented to the TVCC (Teaching veterinary Clinical Complex) of COVAS, Parbhani (College of veterinary and Animal Science), with the complaint of failure of conception even with subsequent mating with different female dogs. Inspite of showing excessive sexual desire and achieving erection and successful mating the female dogs was failed to conceive. Visual examination and palpation of scrotum and inguinal area revealed that the dog had normal penis with rudimentary scrotum and complete absence of both the testes in scrotal sac.

DIAGNOSIS

Manual Palpation:

Upon arrival of the dog at TVCC, and taking complete history, physical examination was carried out and looking at the history, the genitals were checked and the scrotal sac was palpated with finger tips revealing complete absence of both the testicles in the scrotal sac.

Ultrasonography:

The ultrasonography technique used was real time B-mode using transabdominal curvilinear probe of frequency ranging 5-2 MHz. With animal in its lateral recumbency the kidneys were located and the retained testes was searched starting from caudal border of kidney and moving downwards to inguinal region, searching area around the scrotal sac and urinary bladder. The retained testes can be recognised by its echogenicity and texture in comparison with other abdominal organs.

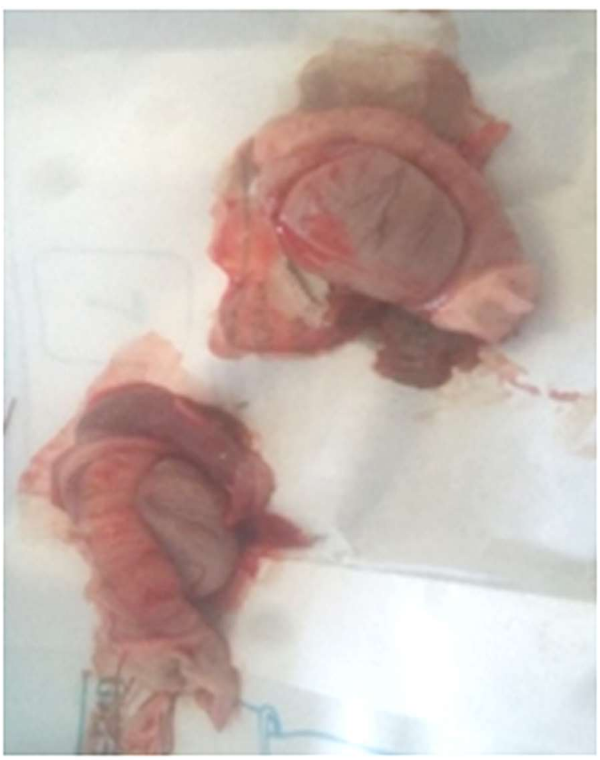

Fig. 1: Removed cryptorchid testes.

Both the retained testes were located successfully using ultrasonography. For the present case the ultrasonography was carried with the dog in dorsal and lateral recumbency.

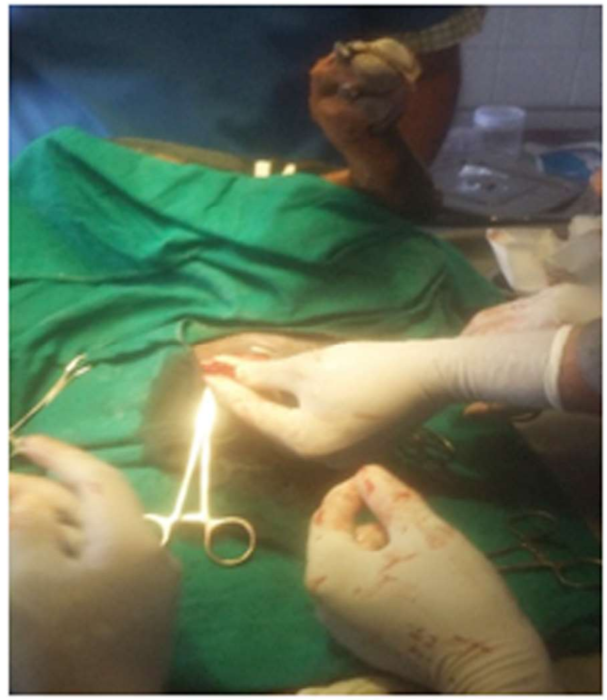

Fig. 2: Picture depicting cryptorchid testicle

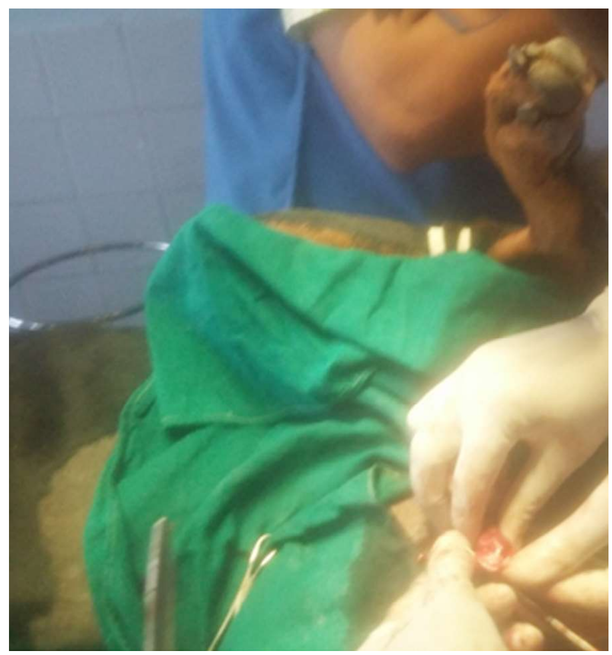

Fig. 3: Picture showing testicle exteriorised

TREATMENT

The location of retained testes was confirmed by ultrasonography and was decided to go for chryptorchidectomy. The dog was kept off feed and water for 8-10 hrs prior to surgery. The dog was administered NSAID (inj. Meloxicam @ 0.2 mg/kg BW IM), supportive fluid (inj. DNS 250 ml IV), broad spectrum antibiotic (inj. Ceftriaxone tazobactum 500 mg IV). As a sedative Inj. Xylazine @ 1 mg/kg BW IM was used. For induction inj. Ketamine @ 10 mg/kg BW IM. The retained testes was removed successfully. The muscle and peritoneum was sutured by simple interrupted suture pattern using catgut no.1 and skin was sutured using nylon. Post operative NSAID, Antibiotic and daily dressing of suture was done for 5 days. The recovered uneventfully.

RESULT AND DISCUSSION

Cryptorchidism is commonly encountered in small animals especially dog and cat, with incidence of 1.2-12.9% in dogs and 1.7-3.8% in cats (Yates *et al.*, 2003).[4] In dogs one of the possible cause is inherited, autosomal recessive trait, with incidence higher in small breeds of dogs than large breeds (Tobias and Johnston, 2013).[5] The other congenital defects noticed in cryptorchid dogs include inguinal and umbilical hernias, penile and preputial problems, luxation of patella (Pendergrass and Hays, 1975).[6] Also there is tendency of retained testes to develop neoplastic changes and the risk of neoplasia has been reported to 9-14 times higher than in scrotal testes (Hays *et al.*, 1985).[7] Among the neoplastic changes the common is Sertoli cell tumours and seminomas (Reif and Brodey, 2010).[8] The diagnosis can be done with manual palpation ultrasonography. Use of Human Chorionic Gonadotrophin (HCG) or Gonadotropin releasing Hormone (GnRH) stimulation Test to induce a measurable change in testosterone can be useful diagnostic tool (Memon and Tibary, 2001).[9] The treatment included removal of retained testes by laparotomy or laproscopic method can also be used. As for the above case, both the retained testicles were removed successfully using surgical laparotomy.

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- Middle name initials provided.
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