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SHORT COMMUNICATION

Impact of *Haematobia exigua* (Buffalo Fly) in Cattle in Namakkal Region, Tamil Nadu

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ABSTRACT

The impact of *Haematobia* fly menace in dairy cows was studied in cattle farms maintaining different breeds of cattle, located in Namakkal district, Tamil Nadu, India during the month of December 2019. The flies collected from each farm were identified as *Haemtobia exigua*. The fly avoidance activities include head throws, tail flicks, ear flicks, leg stamps (front and rear), and skin twitches were recorded for one minute and frequency of activities was correlated with fly intensity in animals. The frequency of tail flicks, skin twitches, ear flicks, head throws and leg stamps was 27.5, 20.3, 13.5, 3.0 and 2.8 respectively when the fly population was fairly high and also these activities were found to be higher in evening than morning. Of the 50 cows examined, 40 cows (80.0%) had skin lesions due to fly bites. Animals with dark colour skin had more lesions (90.32%**)** than medium (75.0%) and animals with light-coloured skin (42.85%). In addition, the prevalence of skin lesion in respect to breed was found to be the high in Jersey cross bred cows (89.18%) followed by *Holstein Friesian* cross (71.42%), but no such lesions were noticed in Tharparkar (0%) breed. The development of fly bite wound sore in relation to fly intensity in cattle was 85, 75 and 60 % in animals that had high (>150), moderate (100 &150) and low infestation (50 & 100) respectively. Approximately 50-100 flies were found to be sufficient to produce lesions, however the severity of lesions depends on level of infestation.

HIGHLIGHTS

- The fly avoidance activities were found to be higher frequency in the evening.
- The skin lesions were found to be more in dark skinned animals than medium and light colour.
- The prevalence of skin lesion was high among Jersey cross followed by HF cross, no lesions in Tharparkar.

Keywords: *Haematobia exigua*, buffalo fly, Fly avoidance activities, Skin sore, Eye sore

Haematobia exigua (buffalo fly) is a major blood sucking economically important pest of cattle in India. They spend most of their time on the animal leaving only to oviposit in fresh dung and usually they feed 24-38 times daily (Madhav *et al.*, 2020). They are present in large numbers as clusters consisting a few hundreds to thousand in an animal and their bite causes severe annoyance, irritation, blood loss, wound sore and interrupted feeding in cattle. Hence, the infested animals may show behavioural changes (fly

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avoidance activities) such as head throws, tail flicks, leg stamps and skin twitches to get rid of fly menace, which results in loss of energy (Boland *et al*., 2008). Besides, continuous piercing of the skin may lead wound sore and this fly also acts as intermediate host for *Stephanofilaria stilesi* and vector for *Staphylococcus aureus* which causes mastitis and trypanosomosis and anaplasmosis among the animals (Bordoloi *et al*., 2019).

It has been recorded that a cow infested with 200 buffalo flies would show reduction of 520 ml milk yield and 28 g live weight gain daily (Jonsson & Mayor, 1999) and causes skin lesions in heavily infested cattle resulting in diminished leather quality (Guglielmone *et al*., 1999). Further, the skin lesions caused by this fly frequently attract the myiasis producing flies for egg laying, thus leading to myiatic wounds. Considering the economic loss and health issues associated with *Haematobia* infestation in cattle farms, the present study was undertaken to explore the impact of fly infestation in dairy farms, as this fly menace has become recurrent episode in Tamil Nadu in the recent years.

A total of five cattle herds consisting of different cattle breeds, located in Namakkal district, Tamil Nadu, India (11.2189° N and 78.1674° E) were selected to study the impact of *Haematobia* fly menace in dairy cows. This study was conducted during the month of December 2019. An average max and min temperature recorded as 30.4°C and 21.4°C respectively during this study.

A snap shot technique (Photography) was used to record fly intensity as employed by Lima *et al*. 2002. In this technique, both sides of each and every animal in the farm was photographed using digital camera (Canon, 8.0 Mega pixel). In order to grade the fly intensity in animals, if the number of flies ranged between 50 & 100, 100 &150 and >150 were designated as low (n=10), medium (n=20) and high fly (n=20) respectively. The flies collected from each farm were identified according to the morphological keys (Kano *et al*., 1972).

In this study, video capturing method (Canon, 8.0 mega pixel) was used to record the animal activities in response to fly menace. The fly avoidance activities include head throws, tail flicks, ear flicks, leg stamps (front and rear), and skin twitches were recorded during peak fly activities i.e. morning (7.00 am – 8. 30 am) and evening (5.00-6.30 pm) for one minute per animal. The frequency of fly avoidance activities observed was correlated with fly intensity to determine threshold level.

In this study, a total of 50 animals in the selected farms were carefully examined for fly inflicted wound sores in the designated parts such as medial canthus of eye and sides of the neck. The data pertaining to skin colour and breed were collected to correlate with fly intensity and development of wound sores.

The flies collected from each farm were identified as *Haematobia exigua* based on the presence of 6 long hairs with curled tip on the second segment of the hind tarsus of the male while female had no such long hairs.

The fly avoidance activities such as head throws, leg stamps, tail flicks and ear flicks and skin twitches in response to fly intensity are shown in table 1. In this study, it was observed that the frequency of tail flicks and skin twitches were found to be high when fly population was fairly high. Earlier workers reported that tail flicking followed by skin twitching were frequent fly avoidance behaviour in cattle and are less energy intensive fly avoidance activity (Dougherty *et al*., 1993; Mullens *et al.,* 2006). The result of the present study is in agreement with observations of Boland *et al*. (2008) who reported that steers that were infested with *Haematobia irritans* (horn flies) exhibited a various fly avoidance behaviour, and in which head throws and tail flicks were positively correlated with fly population.

In this study, the frequency of head throws and leg stamps were found to be more in highly infested cows than those cows with moderate and low infestation. It has been reported that head throwing behaviour is more energy intensive and less frequently used act performed by the cattle for fly avoidance. It indicates that more energy loss could occur in buffalo fly infestation in cattle (Mullen *et al*., 2006). Further, in the present study the frequency of fly avoidance activities was found to be increased with increasing number of flies. The frequency of fly avoidance activities such as head throws >2/min and tail switching 15-36/min was observed in this study. This finding does not corroborate with findings of Harvey and Launchbaugh (1982) who observed that frequency of head tossing (0.45/min) and tail switching (16 per head) in horn fly infested steers. This variation could be due to fly intensity and breed of animals etc.

In this study, the fly avoidance activities were found to be higher in evening than morning. It could be due to mass feeding activity of buffalo flies, which found in clusters on the dorsal aspect of the cow before sunset. This observation is akin to the findings of Bruce, (1964) who stated that two mass feedings occur in horn flies per day in the field, i.e. one at sunrise and one just before sunset.

In this study, a total of 50 animals of different breeds were examined for fly associated skin lesions by visual examination, of which 40 cows were found to have developed lesions due to fly bites. The lesions were found mainly in the eye and neck, usually bilateral. The occurrence of lesions in relation to breed, skin colour and fly intensity are shown in table 2.

In the present study, it was observed that animals with dark colour skin had more lesions (90.32%**)** (Fig. 1) than medium (75.0%) and animals with light-coloured skin (42.85%). It could be due to the dark colour skin may be more attractive for flies than medium and light-coloured skin. This finding is in agreement with the findings of Johnson and Toleman (1988) who reported that dark coloured animals had more skin lesions than the medium and light-coloured animals. Breijo *et al*. (2014) attributed the presence of more number of *H. irritans* (Horn flies) in dark skinned animals to the presence of thinner epidermis than light coloured animals and further they also observed that the flies that were caught from dark skinned animal had more amount of haemoglobin. Accessibility to blood vessels is directly proportional to thickness of epidermis

Table 1: Fly avoidance activities of dairy cows in response to buffalo fly intensity

Fly avoidance activities/min	Fly intensity					
	Morning (7.00-8.30 am)			Evening (5.00-6.30 pm)		
	50-100	100-150	>150	50-100	100-150	>150
Head throw	2.3	2.8	3.0	2.8	3.3	3.4
Leg stamp	1.1	2.3	2.8	1.2	2.7	3.1
Tail flick	15.5	23.1	27.5	15.0	29.4	36.2
Ear flick	12.1	12.0	13.5	12.5	12.5	15.2
Skin twitch	14.5	19.3	20.3	17.5	21.1	25.8

Table 2: Influence of breed, skin colour and fly intensity on development of skin lesions in cattle due to *H.exigua* (buffalo fly) infestations

Class	No. of animals examined (n=50)	No. of animals had lesion (%)
Genotype		
Jersey cross	37	33 (89.18)
Holstein Friesian cross	7	5 (71.42)
Tharparkar (Indian breed)	2	0 (00.00)
Non descriptive	4	2 (50.00)
Phenotype		
Skin colour		
Light colour	7	3 (42.85)
Medium colour	12	9 (75.00)
Dark colour	31	28 (90.32)
Fly intensity		
50-100	10	6 (60.00)
100-150	20	15 (75.00)
>150	20	17 (85.00)

Fig. 1: *Haematobia exigua* (Buffalo fly) infested Holstein Friesian cow showing skin sore on the neck

Fig. 2: Eye sore in *Haematobia exigua* (Buffalo fly) infested Jersey cow

in animal, which may vary with phenotype. Hence, it is presumed that in dark skinned animals the epidermis may be thinner, and which enables the arthropods to access blood vessels quickly, this might be the reason why the dark skinned animals had more infestation. It has also been opined by the some authors that *H.irritans* (Horn flies) fly prefers the heat of the animal body, since the black skin retains more heat than light colour skin, more number of flies may have been attracted by the black skinned animals (Rodriguez-Gallegos and Acosta-Rodriguez, 2011). In contrast, the result of the present study differs from the findings of Holroyd *et al*. (1984) who reported that no relationship between coat colour and occurrence of lesion in buffalo fly infested cattle.

In this study, the highest percentage of skin lesions was recorded in Jersey cross bred cows (89.18%) (Fig. 2) followed by Holstein Friesian cross bred cows (71.42%), while no such lesions were noticed in Tharparkar breed. The variation in the development of lesions might be due to variation in the thickness of the dermis in different genotype of animal and their sensitivity/ resistance to fly bites. This result is in consonance with the findings of Johnson and Toleman (1988) who reported that the prevalence of lesions was significantly lower in genotype with higher *B.indicus* content ($P<0.01$).

The prevalence of fly bite wound sore in was 85, 75 and 60 % respectively in cattle that had high, moderate and low infestation. The results of the study revealed that 50-100 flies are sufficient to produce lesions, however the severity of lesions depends on the level of infestation. These findings are in corroboration with earlier reports of Guglielmone *et al*. (1999) who observed that the degree of injuries in the hides due to *H.irritans* (Horn flies) is depending upon fly numbers by histological study of fly infested skin.

In contrast, Holroyd *et al*. (1984) stated that the prevalence of lesions in *B. indicus* × *B. taurus* cattle was not influenced by buffalo fly numbers (*Haematobia irritans exigua*) or skin colour in Swans Lagoon, North Queensland and further they explained that the lesion is possibly as result of individual sensitivity to fly bite rather than number of flies.

During this study, oozing of blood was noticed from the wound that were in progressive stage. But later on, it became dry and covered with crust. It was observed that the lesions often exacerbated due to rubbing by cattle to get rid of irritation.

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