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Analysis of pest flies in cattle and their effect on behavioural response in cattle

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Abstract

India is an agriculture-based country. People in India mostly practice mixed farming. Mixed farming constitutes farming along with rearing of livestock. Animal husbandry is a significant source of income for many farmers in India. Numerous vertebrates, including domestic animals such as cows, are severely harmed by ectoparasites, resulting in anaemia, weakness, and even mortality of the host animal. Among the ectoparasites, flies are important carriers of diseases including trypanosomiasis and the bovine leucosis virus, among others. Bovine Leukaemia Virus which is spread by horn flies, is the most prevalent neoplastic illness in cattle. Ectoparasitic infection is the major threat to the maintenance and health of live cattle. Hence, the present study was conducted to analyse some pest flies in cattle and their effect on behavioural response in cattle of the Gavandgaon village of Degloor taluka of Nanded district (M.S.) during June 2022 to August 2022. In this study a total 16 cattle were physically observed to study different pest flies in cattle and their impact on behavioural response in cattle.

Keywords: Pest flies, cattle, behavioural response, animal husbandry

1. Introduction

India, a tropical nation, experiences high fly attack issues in the summer that have a negative impact on the health and productivity of dairy animals. Fly attacks can damage animal welfare and result in financial losses since the animals' anxiety causes them to stop eating and produce less milk.

Since the pasturelands have been dramatically declining in India over the past few decades, intensive management approaches have become more prevalent in order to boost productivity and efficiency. Even though these technologies have made it possible to have more control over some environmental conditions, farmers still face difficulties from environmental stresses. Environmental stresses can have a severe effect on animal welfare and production, particularly when there is no way for the animals to escape the stressors. Attack of the pest flies are one of the stressors which has economic and welfare concern in dairy cattle production systems. Cattle weight growth may be reduced by 0.1 kg per day, according to Altunsoy and Kilic (Altunsoy, 2012)^[1], if the animal experiences daily attacks from close to 65 blood-sucking insects. Therefore, substantial action must be taken to protect cattle from tick and fly attacks. (Altunsoy, 2012)^[1]

Biting and nuisance flies adversely affect cattle health and reduce farm profitability (Taylor, 2012)^[12] since there are few practical solutions to reduce fly pressure, fly control is a constant source of discussion among dairy farmers.

The veterinary industry is concerned with about 20 fly families. The fact that flies only contact animals for short periods of time is one of their most difficult traits (Kumar, 2011). Since actions must be taken at the exact correct time, adequate control can occasionally be challenging. Following are some common flies of cattle. The management, prevention, and control of both vector and pathogen are primarily reliant on the use of synthetic chemical pesticides by dairy producers. However, their negative side effects, and resistance are a matter of concern in present days.

2. Materials and Methods

2.1 Study area

This study was conducted in the cattle shed of Gavandgaon village. Gavandgaon is a village in the Degloor taluka, Nanded District.

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It is situated 10 km away from degloor. It is a part of the Aurangabad Division. A total 16 cattle consisting 10 cows 02 calves and 02 bulls of a cattle shed were studied. The reason for selection of given study area is because of mostly farmers of a given study area practices mixed farming and they have cattle as their primary livestock.

2.2 Collection and identification of Flies

Flies were collected with the help of collecting nets which were made up of thin nylon.

Then those collected flies were transported to the 'killing jar' Containing Ethyl acetate which is regarded as the most satisfactory liquid killing agent. Its less toxic to humans than other liquid killing agents. It kills insects slowly. Specimens that appear dead may survive if removed from the killing jar too soon. Collected flies were identified with the help of standard identification keys. Once flies were identified they were free to let go. No species was intentionally harmed during present research.

3. Result and discussion

3.1 In the present research flies observed in cattle shed were as mentioned below and some important biological aspects were given.

3.1.1 Horn Flies

The horn fly causes discomfort, aggravation, and disruptions to typical activities like eating, sleeping, and resting. The insect bites repeatedly and pierces the skin to feed on blood. They lead to weight loss and decreased milk output in cattle with large summertime populations. The animals may be more susceptible to secondary infection if they have open sores on their heads and underlines as a result of horn flies. They are suspected of mechanically transmitting anaplasmosis and other infections within the herd due to their piercing and sucking mouth parts. Horn flies are the potential vectors for several diseases in cattle such as Bovine anaplasmosis, *Corynebacterium* and pseudotuberculosis (Butler, 1999) [2]

3.1.2 Face Fly

Face flies are similar to house flies but Colour is darker than house fly. and consume bodily fluids, typically in cows' eyes and mouths. Face flies only stay on their host for a short period of time. These flies are primarily a concern for pastured cattle because they rarely enter barns or animal shelters and are most active during the day. Although face flies' eating habits are irritating to cattle, there is little proof

that their growth or milk output have been adversely impacted.

3.1.3 Stable Fly

Although adult stable flies and house flies look very similar, the piercing mouthparts that protrude from under the head make them immediately distinguishable. On the legs of cows, these flies are frequently encountered. The agony of stable fly bites is severe. Cattle under stress from frequent bites produce less milk and grow less weight. Adult stable flies are challenging to control. At any given time, only a small portion of the entire population is found on cows, and the majority of chemical sprays are rubbed or washed off of cows before producing the desired results. One of the most popular techniques for managing populations is the reduction or deletion of breeding grounds. To prevent dispersal, management efforts at breeding locations frequently need to be coordinated with nearby farms.

3.1.4 Deer Fly

Deer flies, also known as Tabanids, are insects that can often fly very well. Only the females bite, just like mosquitoes. They typically feed during the day and are ferocious biters. Their attacks frequently cause decreased milk production and weight growth. There are a variety of fly species that are thought to be major pests of both free-ranging and confined cattle.

3.1.5 Horse Fly

Like deer fly, Horse flies also known as Tabanids. Horse fly are significant pathogen vectors and result in both direct and indirect losses in the production of livestock. Horse flies are hematophagous dipterans that directly affect the output of livestock by irritating, stressing out, and causing blood loss in animals, especially in cattle and horses. In fact, horse flies have directly resulted in decreases in the weight gain of cattle of 0.1 to 1 kg per day (Foil, 1994) [5]

3.1.6 House Fly

House flies are dull grey in colour and 0.25 inches length. Most dairy and feedlot cattle suffer from house flies. House fly consume plant matter, dung, and secretions from the eyes and nose. Life cycle: A fly takes 10 to 14 days to develop from egg to mature fly. I have observed that the amount of time spent feeding will decrease, and cattle will engage in fly avoidance activities.

Table 1: Common Flies of Dairy Cattle

	Horn Fly	Face Fly	Stable Fly	Deer Fly	Horse Fly
Characteristics	Size is small than that of house fly; 3/16-inch-long	Colour darker than house fly	Size is Smaller than house fly	Slightly larger than house fly	Largest in size, 0.4 to 1.3 inches long
Preferred Host Material	cattle waste (Fresh)	cattle waste (Fresh)	Spoiled organic material	Mud or near pond or creek	Mud or saturated vegetation in marshes or near pond or creek
Life Cycle	10-20 days	3 weeks	14-24 days	Late spring into summer	Late spring into summer
Feeding and Resting Area on Animal	Sides and back area of cattle	Eyes, mouth and muzzle	Front legs, sides, back, tail and belly	Back and belly	Back and belly
Meals per Day	20-30 times /fly/day	2-3 times a day and present 2-5 minutes	Feed only during the Day time and during Feeding time only	20-30 times per fly/ day for 5 min	10-15 times per fly/ day
References	(Cortinas, 2006) [3]	(Cortinas, 2006) [3]	(Cortinas, 2006) [3] (Taylor D. B., 2007) [11]	(Cortinas, 2006) [3]	(Galloway, 2002) [6]

3.2 Behavioural Responses of Cattle to Pest Flies

Dairy cows have evolved a variety of fly avoidance

behaviours that consume energy and interfere with daily normal behaviours like feeding and relaxing (Dougherty,

1993)^[4]. The fly avoidance behaviours are explained below.

3.2.1 Tail Flicking

Tail flicking is the most common and frequent fly-avoidance behaviour in cattle. (Dougherty, 1993)^[4]. I observed that some cattle were continuously flicking their tails due to fear of a fly's bite. Also, flicking of the tail was done on the animals' side like a pendulum. Sometimes tail was lifted during flicking; this strong movement of tail is for avoidance of flies to get closer to body parts. Its effective to remove flies which are present near back, rear legs.

3.2.2 Licking nose

I have observed that when face flies and house flies were near the nasal area the cattle licked their nose and sometimes inserted their tongue to prevent themselves from attacking flies. Mostly face flies were responsible for this kind of behaviour as face fly feeds on the nasal secretions of cattle.

3.2.3 Side licking

Fly avoidance behavioural studies rarely examine the side-licking behaviour of cattle. Although it is acknowledged as a behaviour that is a direct and immediate response to a biting fly, it is more frequently described in studies of ungulate auto-grooming behaviour (Mooring, 2006)^[8]. I've noticed that after the flies' bite, the cattle lick the side at the place of the bite. The head being thrown to the side of the body is an example of a conscious behavioural reaction to a painful fly bite (Mooring, 2006)^[8].

3.2.4 Ear wiggling

This kind of action was performed when pest flies were near the vicinity of ears. There were various kinds of movements of ear in cattle such as wagging of a single ear, wagging of both ears one after another and wagging of ears simultaneously. This type of behaviour was performed by cattle to ward off flies. Mostly face flies were responsible for this type of behaviour.

3.2.5 Group bunching

In various investigations, it has been noted that cattle will bunch up or assemble in groups in response to fly attack pressure. (Schmidtman, 1981)^[10]. I have noticed that when flies were in large number then cattle were trying to get together and assembled in group.

3.2.6 Leg stamping

Leg stamping or foot stomping is a movement not related to locomotion but it is used to try to push biting flies away. (Dougherty, 1993)^[4]. When flies were trying to attack on front and rear legs, near belly, on ventral side of body, near cow's udder, bulls' testicles and side of belly this kind of behaviour was observed. To dislodge flies this, fly repelling behaviour is performed.

3.2.7 Head Throwing

I have observed that face flies were the crucial factors for such behaviour in cattle. It consumes more energy of cattle and make them restless and disturbs while feeding (Dougherty, 1993)^[4]. Head moves left to right and vice versa depending upon the position of attacking flies near face area of cattle. Sometimes head moves in semi-circular motion. Also, I want to notify here, during head throwing cattle were letting out a sigh.

3.2.8 Skin Twitching

The second most common avoidance strategy, skin twitching, requires less energy than other fly avoidance techniques (Mullens, 2006)^[9]. Its involuntary in nature. I observed that when a fly tries to settle down on cattle skin, then cattle give an involuntary response to get rid of flies. Skin twitching was mostly on back area side area and belly of cattle. Skin Twitching was directly proportional to the number of stomach and back attacking flies. When those flies number increases skin twitching also increases

3.2.9 Closing of eyes

This behaviour was performed in cattle to protect eyes from attack of flies. Mostly face flies and horn flies were responsible for this behaviour as they feed on the secretions of cattle.

4. Conclusion

From this study it may be concluded that flies adversely affect the behaviour of cattle. Cattle can suffer from chronic irritation and pain from fly bites, which can have a negative impact on their welfare and behaviour as well as their daily activities, health, and productivity. Different behavioural strategies are used by animals to protect themselves from pest flies. The management, prevention, and control of both vector and pathogen are primarily reliant on the use of synthetic chemical pesticides by dairy producers. However, their negative side effects, and resistance are a matter of concern in present days.

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