

A study on the incidence of myiasis among dairy animals in the State of Punjab, India.

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Abstract: Myiasis is the condition where larvae of certain fly species use living hosts as a food source for their growth and development. The results of a retrospective study on the incidence of myiasis among dairy animals in Punjab (India) are reported. A total of 470 larval samples were collected from myiasis affected animals from the different districts of Punjab. The Old World Screwworm (OWS) fly- *Chrysomya bezziana* was found to be the predominating fly species involved in onset of myiasis among dairy animals as the maggots of this fly were encountered in the wounds of 94.2% of animals. Besides, two other species *Musca domestica* and *Sarcophaga ruficornis* were also found infesting the wounds of 3.8% and 1.9% animals respectively. The overall infestation rate was high in summer followed by spring and autumn and least in winter. The most frequently infested body regions were fractured horn, perianal region, tail base, neck among males and vulvar lips, hooves, fractured horn, neck among females. Neglected open wounds, faecal staining, posterior paralysis and ignorance among farmers were found to be the key predisposing factors for onset of myiasis among dairy animals.

Key Words: Myiasis, Parasitosis, Dairy Animals, Dipteran Larva.

I. Introduction

The term myiasis is applied to the injurious action that dipteran larvae cause to the tissues of live humans and other vertebrate animals in which they grow. The condition is commonly found among domestic animals in tropical regions and is a welfare problem of worldwide occurrence particularly in animal raising countries like India. It is a type of parasitosis in which the fly larvae (maggots) invade the neglected open wounds and natural body openings of man and domestic animals and use the living or necrotic tissue, ingested food and body fluids of their host as a nutritional source [1]. The gravid flies are attracted to open wounds or even natural body openings with foul smelling discharge to lay their eggs. Even the wounds as small as the sizes of a tick bite are reported to be sufficient to attract the flies [2]. Oviposition is encouraged by foul smelling purulent discharge from diseased tissue. The exact chemosensory cues causing attraction for oviposition are unknown, but presence of pus and bacterial metabolites in the wounds are known to increase the attractiveness of wounds as oviposition sites [3]. On hatching, the larva invade the broken skin and with their chitinous mandibular oral hooks either burrow into the dermal layers or pre-existing wounds and starts feeding on the tissue, resulting into their enlargement. The feeding activity of the larvae generally cause serious tissue damage, resulting in to loss of condition, injury to the hide and secondary invasion [3]. Parasitized animals do not feed properly, become weak, deficient of blood and in severe cases may result into death due to toxemia and septicemia if left untreated [4, 5].

Myiasis among dairy animals leads to considerable reduction in their productive traits and increased mortality among them, which results in huge economic loss to the poor farmers. The monetary loss to Australian livestock industry due to myiasis was estimated to be \$200 million a year [6]. Although no such estimate has been reported in India but similar huge economic loss due to myiasis among domestic animals is apprehended posing a major threat to livestock industry in India as well. Various reports on myiasis among domestic animals are available in literature [7, 8]. Cases of myiasis in domestic animals had been reported among cattle, sheep, horse and pig concluding the involvement of *Chrysomya bezziana* in 95 per cent of the cases from Australia [9] and 99 per cent cases from India [10]. The fly has been reported to cause myiasis in pet dogs from Hong Kong [11] and other countries [12, 13]. Besides, the fly has also been found responsible worldwide for human myiasis in large number of cases [14].

Despite the severity of the problem of myiasis among domestic animals in Punjab, no data was available regarding the fly species involved and their seasonal occurrence. The objective of the present study therefore was to ascertain the fly species responsible for causing myiasis among dairy animals in the State of Punjab (India), their seasonal occurrence and predisposing factors responsible for this problem. During field surveys the authors observed that the people were ignorant about the actual cause of myiasis and assumed the origin of maggots from within the wounds. Besides generating the basic data about the various aspects of myiasis like, seasonal occurrence, parts of body involved and extent of damage, the present study has also helped to create awareness among masses about the problem.

II. Materials And Methods

Investigations were made on cows and buffaloes from the veterinary hospitals and dairy farms located in 18 districts of the state of Punjab, India. The veterinary hospitals, clinics and dairy farms were visited regularly for a period of three years and the cows and buffaloes were screened for maggot wounds on their body parts. A total of 470 cases of myiasis were reported among dairy animals out of which 38.8% (182) cases were from cattle and 61.2% (288) cases from buffaloes. The severity of infestation varied from 10-15 larvae in small wounds to hundreds of larvae filled in large wounds. The larvae from wounds were removed manually using forceps and were collected in glass vials containing 70% alcohol for their preservation. Turpentine oil plugs were used to evacuate the maggots from the lesions. These maggots were processed for preparing permanent mounts of the taxonomically important body regions like anterior spiracles, posterior spiracles and Cephalopharyngeal skeleton. Identification was done by following the keys available in literature [1]. Some live maggots were also collected in a jar containing moist sawdust and a piece of meat on bloating paper for rearing them to adult stage. Adults were identified with the help of keys [15].

III. Results And Discussions

Myiasis was found to have widespread occurrence among dairy animals throughout the year. The Old World Screwworm fly- *Chrysomya bezziana* was found to be predominating fly species involved in causing myiasis among cows and buffaloes as the maggots of this fly were encountered in the wounds on 94.2% of animals. The finding correlates well with reports from Australia [3] and Malaysia [16, 17]. *C. bezziana* is a worldwide pest of cattle and sheep which occurs throughout much of Africa, India, Arabian Peninsula, Southeast Asia, Indonesia, Philippine and New Guinea [9, 18]. The fly is well known to be an obligatory parasite and unable to develop in carrion [1, 19]. As a result of it the fly has to complete its larval development by parasitizing animals. Though *C. bezziana* has previously been recorded from India among domestic animals [10], the present study reports two other species viz. *Musca domestica* and *Sarcophaga ruficornis* besides *C. bezziana* responsible for causing myiasis among domestic animals. The larvae of common housefly; *M. domestica* was found infesting the wounds of 3.8% animals. The finding that the larvae of *M. domestica* were seen in the wounds of fewer animals can be explained by the fact that the larvae are facultative parasites and it is not essential for them to parasitize animals for completion of their life cycle [1]. It may rather be a matter of chance that the species happened to frequent the animals that lead to the establishment of their larvae into the wounds. While *M. domestica* has not been previously recorded from wounds of domestic animals in India, it was the predominant species causing myiasis among sheep and goats in Egypt [20]. Least number of animals (1.7%) were found to be infested with the larvae of *Sarcophaga ruficornis*. Myiasis due to *Sarcophaga* species is of little significance in veterinary terms as many of the species breed in excrement, carrion and other decomposing organic matter. It is rarely involved in primary myiasis among man and domestic animals [21]. *S. ruficornis* is a secondary myiasis causing fly and is sometimes involved in secondary myiasis following initial infestation by primary myiasis causing species like *C. bezziana* [19]. The larvae of *S. ruficornis* are voracious feeders and hence result into large scale tissue destruction in the wounds infested with the same. One of the buffaloes in the present study was found to be infested with the larvae of both *C. bezziana* and *S. ruficornis*. The buffalo was weak and debilitated since it was severely injured in a road accident. Hundreds of larvae were recovered from the skin lesions with large scale tissue destruction.

Significant differences were found among *Chrysomya bezziana*, *Musca domestica* and *Sarcophaga ruficornis* with respect to their involvement in myiasis among dairy animals in the State of Punjab, India ($P < 0.01$). On the other hand no significant differences existed between cow and buffalo with respect to incidence of myiasis ($P > 0.05$) which indicates that myiasis afflicts all these animals equally and there is no preference of myiasis causing flies for particular host animal. Similar findings were reported from Australia [9] and Malaysia [17]. The study showed a significant positive correlation between season and occurrence of myiasis among dairy animals. The incidence of myiasis was highest during June-August (41.9%) and Sep-Nov (27.8%) when temperature and relative humidity were optimum (Fig. 1). Most of the larval samples were collected between June and November with highest number of cases both for cows and buffaloes. In dry hot season (March-May) and cold season (Dec-Feb) infestation incidences were low (24.0% and 6.1% respectively). *C. bezziana*, the major producer of myiasis among domestic as well as wild animals in oriental region was found to be active from June to November resulting in to the highest incidence of myiasis during these months. It was also recorded several decades ago that the incidence of myiasis due to *C. bezziana* in Malaysia was highest during the same months [16].

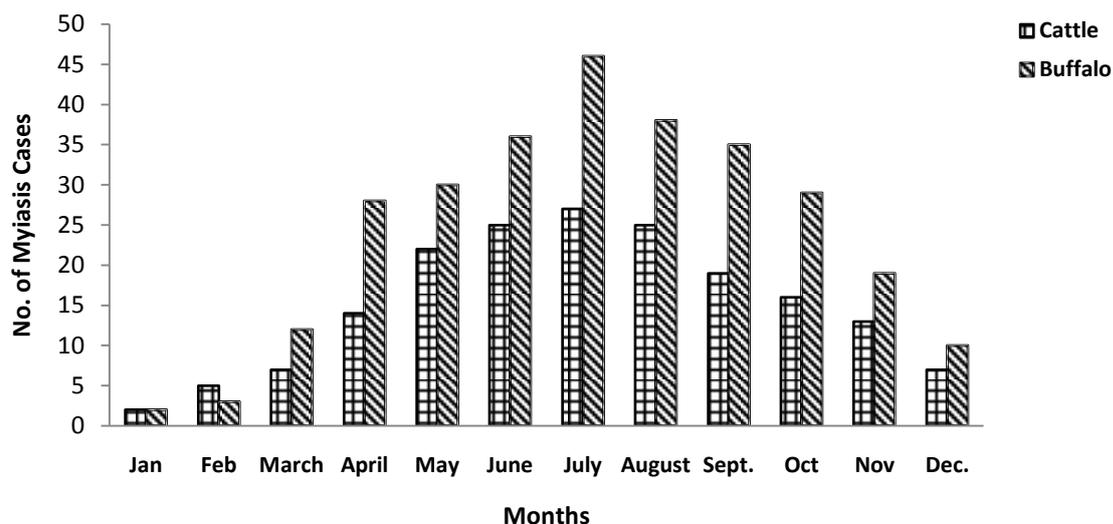


Fig. 1 Seasonal Variation of Myiasis

Among different body regions, vulvar lips were found to be affected the most followed by hooves, fractured horn base, neck, tail base and perianal region among female animals (Fig 2 and 3). The similar findings had also been reported in case of sheep from Hungary [22] and dogs from Israel [5]. The highest number of cases of infestation of vulvar lips may be attributed to the open wounds resulting from injury to the external genitalia during parturition. It is observed that the body parts like tail base, perianal region and hooves are vulnerable to the attack of flies because these regions frequently come in contact with the ground while sitting or walking and become soiled with excreta of these animals. These parts may easily get injured and thus become attractive oviposition sites for the myiasis causing flies.

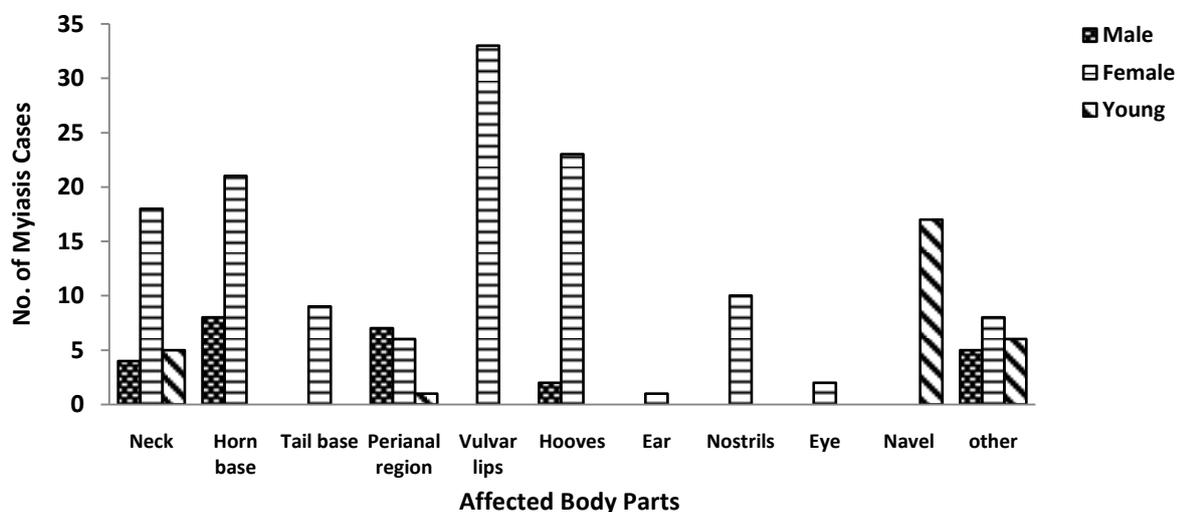


Fig. 2 Myiasis Affected Body Parts in Cattle

Among male animals, horn base was found to be affected the most followed by perianal region, tail base, neck, nostrils and hooves (Fig 2 and 3). It may be explained due to the fact that the body parts like horn and tail are more prone to injuries during fight as compared to other body parts. Neck region in oxen often sustain injuries with plough during tilling of fields whereas frequent injury is caused to nostrils by nose rope thereby serving as one of the favourable sites for onset of myiasis. Among young ones, the navels of newborn animals serve as prominent sites for myiasis. Similar findings were reported among domestic mammals from Bangladesh [23]. All the collected larval samples were of third instars. This might be attributed to the fact that the domestic animals are taken to the veterinary hospitals for treatment of their maggot wounds only when the maggots become visible externally and it happens only when they are fully grown. Out of a total of 470 samples collected, 61.2% (288) were from buffaloes and 38.7% (182) from cows. This may be attributed to the fact that

the buffalo dominates among the livestock population of the state. Similarly stakes are high in taking care of the buffaloes due to economic reasons.

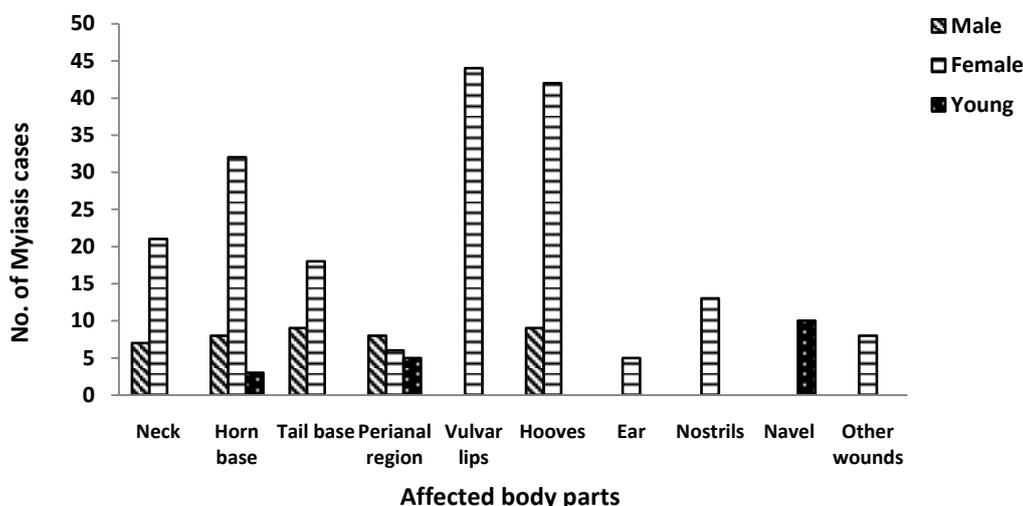


Fig.3 Myiasis Affected Body Parts in Buffaloes

IV. Conclusion

Problem of myiasis is a matter of great concern among medical and veterinary fields. At the same time it is of great economic importance in an agriculture based country like India, where the economic status of a big chunk of the population depends on the livestock industry. Myiasis has long been recognized as a cause of decreased productivity in the livestock industry due to pathological effects and management costs. The need of the hour is to spread awareness among the masses about the actual cause and factors responsible for the occurrence of myiasis, so that this menace can be controlled among domestic animals. The preventive measures like maintenance of neat and clean surroundings, control of fly populations, use of screens and covering of wounds can be helpful in protecting livestock animals from myiatic infestations.

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