Block the Bite by Mosquito Net: Farmer's Innovation in Protecting the Livestock

Bharemara Lingaraju Balaraju[1]*, Hema Tripathi[2] and Haranahalli Vasanthachar Manjunathachar[3]

[1]Department of V&AHE, Veterinary College, Hassan, Karnataka, INDIA
[2]AKMU, ICAR-CIRB, Hisar, Haryana, INDIA
[3]ICMR-National Institute for Research in Tribal Health, Jabalpur, Madhya Pradesh, INDIA

***Corresponding author:** balaraju606@gmail.com

Rec. Date:	Dec 28, 2018 09:48
Accept Date:	Apr 21, 2019 08:45
DOI	10.5455/ijlr.20171228094805

Abstract

The tropical climate of Indian sub-continent is conducive for many arthropod parasites to multiply rapidly, grow and disperse in wider geographical area. Over 20% of all emerging infectious diseases are arthropod-borne pathogens. Arthropods mainly, mosquitoes, ticks and flies like Culicoides play significant role in spreading deadly pathogens, causing annoyance, restlessness and other deleterious effect on health of humans and animals, which in turns leads to production losses in animals. It is well known fact that, developing countries like India, majority of the farmers are mainly depend on animal husbandry practices along with agricultural activities for their livelihood. In India, small and marginal farmers are more and any loss in livestock production interns of reduction in livestock fitness, weight gain, and animal welfare, will have direct negative effect on farmers livelihood. Furthermore, major arthropods like mosquitoes, tick and flies act as vectors to aid in transmission of pathogen between livestock reservoirs (epizootics) and incidentally humans (zoonotic diseases). In tropical countries like India, parasitic infestation (ectoparasites and endoparasites) is one of the major threats to livestock production system and due to their direct and indirect (vector potential) effects. So, it's very crucial to safeguard livestock from the bite and annoyance of ectoparasites to avoid transmission cycle and to enhance animal husbandry activities.

Key words: Culicoides, Farmers, Livestock, Mosquito Net, Flies

How to cite: Lingaraju, B., Tripathi, H., & Manjunathachar, H. V. (2019). Block the Bite by Mosquito Net: Farmer's Innovation in Protecting the Livestock. International Journal of Livestock Research, 9(7), 267-271. doi: 10.5455/ijlr.20171228094805

Introduction

Vector-borne diseases (VBDs) are the infectious diseases transmitted through a competent vector, between humans or from animals to humans. World Health Organization (WHO) reported that VBDs account for more than 17% of all infectious diseases and cause more than 1 million deaths annually (WHO Country Office for India, 2014 and WHO, 2016). Many of these vectors are haematophagus in nature, which ingest pathogen during feeding from an infected host (human or animal) and transfer to new host in their

subsequent blood meal. Among all, mosquitoes rank first in vector capacity. Others include ticks, flies, sandflies, fleas, triatomine bugs and some freshwater aquatic snails. "Block the Bite" is a campaign for creating awareness on mosquito borne diseases *viz.*, malaria, Japanese encephalitis, filariasis, yellow fever and dengue in humans, worldwide. In case of livestock's, mosquitoes transmit a number of pathogens like, avian smallpox, classical swine fever/hog cholera virus as well as *Dirofilaria immitis* heartworm of dogs and cats, filarial worms in cattle in tropical climatic conditions (Das and Das, 2006; Sabu and Subramanian, 2007). Apart from mosquitoes, tiny small midges like culicoides (Diptera: Ceratopogonidae) are involved in transmission of bluetongue virus (BTV), African horse sickness (AHS) virus, epizootic hemorrhagic disease virus, equine encephalitis virus, akabane virus, bovine ephemeral fever virus and viruses in the palyam group (Mellor *et al.*, 2009). In similar line, there is a need for creating awareness in people involved in livestock sector *i.e.* 'Block the Bite by Mosquito Net'. Since, biting by mosquitoes and flies will eventually reduce the livestock fitness, weight gain, and animal welfare due to pain and stress (Garros *et al.*, 2018). Furthermore, mosquito feeding may also result in pathogen transmission between livestock reservoirs (epizootics) and incidentally humans (zoonotic diseases). Present observation was made in Davanagere district of Karnataka state, where livestock farmers adopted mosquito net technology in animal shed to protect their livestock (cattle, buffalo, sheep and goat), guarding dogs from the mosquitoes and flies. There was lot of re-invention in the mosquito net technology made by farmers in resource poor setup to prevent mosquitoes and flies. In this district, farmers are prepared the mosquito net on their own using old sarees (dress used by ladies). In connection to this, local shop keepers have made readymade nets based on farmer's idea from materials like, cotton, polyethylene, polyester, polypropylene and nylon and may be re-tailored based on the farmers requirement.

Mosquito net is an age-old practice and mainly used by humans to protect them from mosquito bite (Narladkar and Shivpuje, 2014). In recent times a good number of farmers effectively utilizing mosquito net technology, irrespective of their socio-economic status, herd size, housing system and type of livestock kept for protecting the animals from wide range of flying parasites. In some part of the world, people using medicated nets that may be insecticidal or insect repellent to safe guard the animal health. Resource rich livestock farmers can employ the fly proof housing, commercial mosquito repellents, fly trappers, fan or any other advanced innovations in protecting the animals from mosquitoes and flies. But these advanced technologies may not be relevant for resource poor farmers. Therefore, locally made mosquito nets will be one of the effective tools in protecting the livestock from the mosquitoes and flies in keeping the of farmers' socio-economic status.

DOI 10.5455/ijlr.20171228094805

Fig. 1: Farmer with cotton mosquito net in open space for protecting sheep and cattle from mosquitoes and flies

Farmers must restrain the livestock with ropes, poles and barricades to prevent any damage to the mosquito net, because these nets are highly delicate and easily get tear off. Hence, to prevent the damage to the net and to avoid the chances of strangulation, suitable arrangements must be made. If the farmers having livestock sheds and which is covered with wall and roofs, mosquito net can be used to cover the windows, open area and doors to prevent the entry of flies and mosquitoes. In some cases, farmers keeping the livestock in open area, if they need to protect the animals from the annoyance of arthropod vectors, the mosquito net must be covered from all the sides like North-South, East-West and on top side also. There should not be any space or gap for the entry of mosquitoes/flies into animal enclosers. The durability of the nets which are made up of sari varies with the quality of the sari which was used. In the field conditions, farmers opined that mosquito nets made up of sari can be used up to two years. Similar type of work has been conducted in Maharashtra for integrated management of culicoides where, they used net shed with pitch roof (gable type) fitted with hurricane type ventilator at its top to minimize host-pest contact (Narladkar and Shivpuje, 2014).

Fig. 2: Farmer using the old sarees as the mosquito net in animal shed

Fig. 3: Sheep and goats were protected from the mosquito bite using net

DOI 10.5455/ijlr.20171228094805

Fig. 4: Shade net used in open space to protect small ruminants from flies

Fig. 5: Shade net used within animal shed to protect buffaloes from fly and mosquito

Advantages of Adopting Mosquito Net Technology in Livestock Production System

1) Animal welfare issues can be achieved by providing pest free environment to livestock.
2) The cost involved in adopting net innovation is minimum and affordable to resource poor farmers. Locally available materials like old sarees can be used as nets in animal housing.
3) The traditional mosquito repellent practice like smoking is not much ecofriendly, hence net technology may reduce the smoking condition to certain extent.
4) Nets are economical and affordable, one-time investment in purchasing nets and its utility may long last.
5) The net technology is easy to use, with no complexity involved and is culturally compatible.
6) Mosquito net acts as physical barrier between vector and host, in turn helps in prevention of vector borne livestock diseases *viz.*, trypanosomiosis, bovine ephemeral fever, bovine viral diarrhea, blue tongue disease and hypoderma etc.

Conclusion

With shrinking of grazing land, livestock rearing system is shifting towards 'zero grazing'. Global warming is leading to enhanced transmission rate of parasites and pathogens with higher virulence. Hence, mosquito net technology will be the effective tool in tropical climate for providing annoyance free environment for the livestock, preventing the outbreak of vector born livestock diseases and to achieve the animal welfare.

References

1. WHO Country Office for India (2014). Vector-borne diseases in India: An analysis from a health systems approach. New Delhi.
2. World Health Organization. (2016). Vector-borne disease. http://www.who.int/en/news-room/factsheets/detail/vector-borne-diseases.
3. World Health Organization. World Malaria Report. (2014). December 2014.
4. Dam T, Das P. (2006). The importance of dirofilariasis in India. *Internet J Parasitic Dis*. 2006;1
5. Sabu L and subramanian H. (2007). Prevalence and vector potentiality of mosquitoes from Thissur, Kerala. *Journal of Vet. Parasitol*. 21:165–167
6. Garros, C., Bouyer, J., Takken, W. and Smallegange, RC. (2018). Pests and vector-borne diseases in the livestock industry. Ecology and Control of Vector-borne diseases. 5:611, 2018. ISBN: 978-90-8686-315-0. https://doi.org/10.3920/978-90-8686-863-6

DOI 10.5455/ijlr.20171228094805

7. Mellor, P., Baylis, M. and Mertens, P. (2009). Bluetongue. Elsevier, Oxford, UK.
8. Narladkar BW and Shivpuje PR. (2014). Fly proof net shed for livestock: A novel concept of physical barrier for integrated management of Culicoides spp. (Diptera: Ceratopogonidae), *Veterinary World*, 7(11): 899-908.

DOI 10.5455/ijlr.20171228094805