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Infestation of *Haematopinus quadripertusus* in a cross-breed cow in Tamil Nadu: Case report

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Abstract

Haematopinus is the only genus in the family of Haematopinidae, well known for the ungulate lice and in total, 21 species have been described under this genus. From India only a few species of *Haematopinus* and closely related genus have been recorded. Adults are normally found on the distal area of the tail and oviposit on the tail hairs. In heavy infestations untreated animals may result in mortality. Therefore, early diagnosis will help in administration of drug for quick recovery which reduces unwanted complication that occurs due to lice infestations. In managemental view regular disinfection of infested herd and farm equipment is helpful to prevent the further transmission.

Keywords: Cattle, *Haematopinus quadripertusus*, Morphology

Introduction

Lice infestation is a common ectoparasitic infestations that occurs in mammals, birds and aquatic fishes throughout the world. They are unique and differing from other metazoan parasites, by completing their entire life cycle on a single host. Lice infestation is predominant in winter and common with overcrowded animal population and unhygienic farm maintenance. Transmission is mainly through direct contact from infested animals or from contaminated fomites. Prevalence of lice infestation in India is widely recorded in cattle, buffalo, sheep, goat, swine, mithun, elephant, dog, cat and birds (Mishra *et al.*, 2017; Ajith *et al.*, 2017; Rashmi and Saxena, 2016; Chamuah *et al.*, 2014; Arunachalam *et al.*, 2013) ^[1, 2, 4, 9, 11]. High degree of host specificity of lice enabling to understand host-parasite interaction and play role in transmission of pathogens like, virus, bacteria, helminth, protozoa and rickettsia by repeatedly sucking or chewing of food from the host. Sucking lice solely feed on blood from minute capillaries and biting lice will chew on feathers, hair follicles and dead tissue debris (Mullen and Durden, 2002) ^[10]. Based on their feeding habit they have developed their own digestive mechanism and from which few salivary enzymes and endosymbiont bacteria in mycetocytes have been characterized (Boyd and Reed, 2012; Zelazowska and Bilifiski, 1999) ^[3, 18]. Lice infestation significantly causes economic losses in affected animals, by damaging the skin & hide quality, productivity, hypersensitivity reaction, and impaired growth. Likewise, indirectly it is related with secondary bacterial infections, myiasis in the biting site, and unthrifty appearance (Solouma *et al.*, 2017) ^[15]. Stress, poor nutrition, pregnancy and lactation periods are the few preferable factors, which will increase the infestation (Egri, 2008) ^[6].

Materials and Methods

The Jersey cross bred cow was brought to Veterinary hospital, Athangudi Karaikudi taluk of Sivaganga district ((9°.43' and 10°.22' North Latitude and 77°, 47' and 78°.49' East longitudes) in Tamil Nadu, India with history of biting of tail and tail switch. On examination, cow was found to have matting of tail switch with greyish white lice eggs and lice. Lice were collected from the tail and preserved in 70% alcohol. Collected lice were processed by following the standard protocols. Briefly, lice were kept in 10% potassium hydroxide solution for 2 hours to clear the cuticular structures with intermittent checking of the parasite under the

microscope for its clearance. The parasites were washed with distilled water and dehydrated in ascending grades (30, 50, 70, 90, and 100 percent) of alcohol (Tasawar *et al.*, 2007) [16]. The dehydrated specimens were cleared in xylene and mounted in Canada Balsam and identified under the microscope.

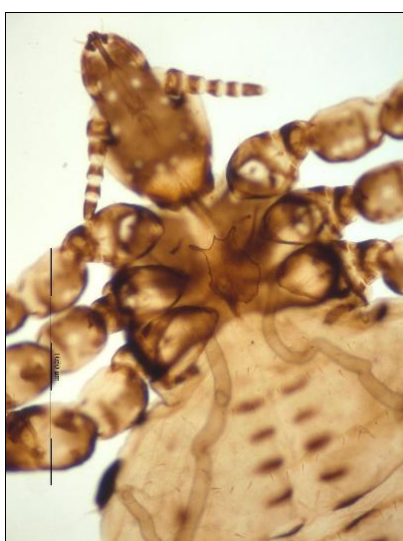
Results

Identification of lice was done based on its complex characteristic features to its genus and species level. However, lice are highly host-specific; so, in many cases the species of host and site of infestations may provide a reliable initial hint for identification. In this case the lice infestation was observed in the cattle tail (Picture-01).



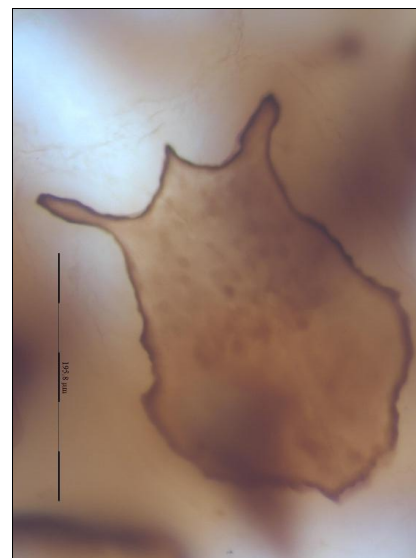
Picture 1: Lice and nits in cattle tail

Based on our findings such as slender head which is narrower than the thorax and acute anterior margin, the lice were identified as sucking lice. The other typical morphological characters are 5 segmented antennae, lack maxillary palps, absence of eye, but possess prominent angular processes, known as ocular points or temporal angles (Picture-02).



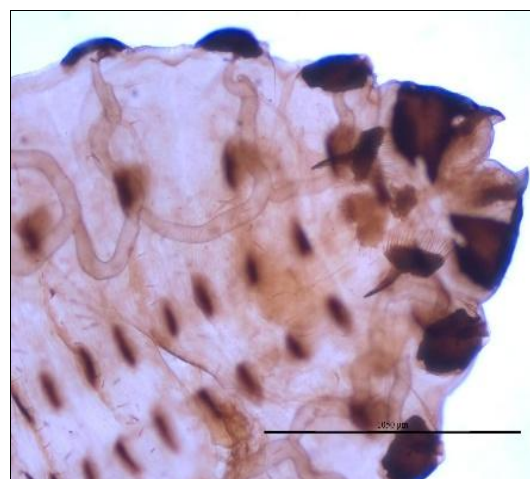
Picture 2: Slender head with 5 segmented antennae, and absence of eye

It has a dark, well-developed thoracic sternal plate, longer than wide, with long and acute median projection and sternal pits outside the plate are the characteristic features that helps in the species differentiation (Picture-03).

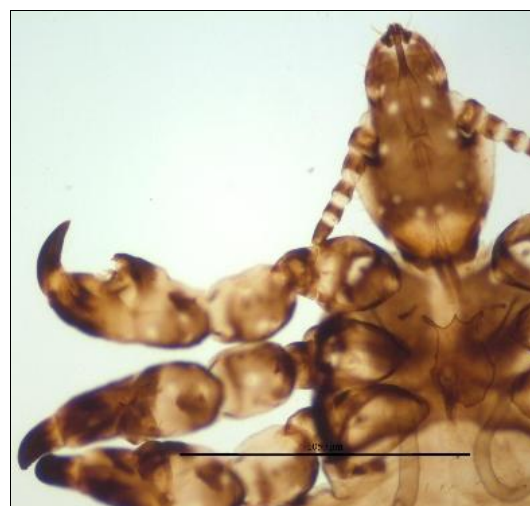


Picture 3: Characteristic sternal plate of *Haematopinus quadripertusus* Fahrenhotz, 1916

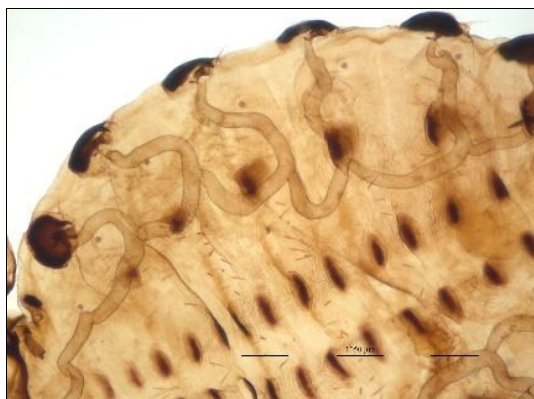
All 3 thoracic segments are fused to form single segment, and the distinctly sclerotised paratergal plates in abdominal segments was the characteristic feature of sucking lice that guided to identify the genus *Haematopinus* (Picture-04). The legs are of similar sizes, each terminating in a single large claw that opposes the tibial spur (Picture-5). Abdominal segments have extremely thick tracheal trunks (Picture-6).



Picture 4: Sclerotized paratergal plates



Picture 5: Leg with single claw



Picture 6: Tracheal trunk

Processed lice were microscopically identified as *H. quadripertusus*, based on their morphological features (Taylor *et al.*, 2015) ^[17]. The thoracic sternal plate can be used to differentiate *H. quadripertusus* from other species of *Haematopinus* cattle lice. For example, sternal plate median process is long and acute in *H. quadripertusus*, blunt or round in *H. eurysternus* and subrectangular sternal plate in *H. tuberculatus*.

Treatment

Ivermectin at the dose rate of 200 mg/kg body weight administered subcutaneously. Macrocytic lactones ivermectin, eprinomectin, and doramectin are also used to control lice in cattle. Injectable formulations are primarily effective against bloodsucking lice. For complete recovery treatment was repeated at a 7-days interval to kill the nymphal stage lice that have hatched from the eggs in the meantime (Arunachalam *et al.*, 2013) ^[12].

Discussion

In India only few species of *Haematopinus* have been recorded in different host for example Indian hog (Rashmi *et al.*, 2011) ^[11]; *H. quadripertusus* on cattle from Nagpur, *H. tuberculatus* on buffalo from Dehradun (Rawat, 1992) ^[12], Rampur (Rashmi *et al.*, 2016) ^[11], and *Haematopinus* spp on cattle from Namakkal (Arunachalam *et al.*, 2013) ^[12]. In this particular species, adults are normally found on the distal area of the tail and oviposit on the tail hairs. Heavy infestations may extend to other parts of the body, such as the dewlap, or surround the eyes (Durden, 2019; Egri, 2018) ^[5, 6]. The eggs of *H. quadripertusus* hatch into nymphs after 7-9 days depending on the climatic conditions. Nymphs disperse over the entire body surface of the host, but adults are most commonly found on the tail head. Adults emerge after three nymphal moults (12 days). Females start to lay eggs after 4 days. The entire life cycle is completed in 2-3 weeks. Lice infestations will cause intense irritation, resulting in rubbing and scratching, restlessness leading to loss of condition and loss of hair in its predilection site. However, heavy infestation is threat to young, malnourished, and untreated animals, leads to severe anaemia, which may result in mortality (Sahito *et al.*, 2017) ^[13]. Genera are acting as vectors for various infectious diseases viz, swine pox, *Trypanosoma evansi*, and *Anaplasma marginale* (*Haematopinus tuberculatus*), *Bartonella* spp., *Mycoplasma* sp., and *Yersinia pestis* (Egri, 2018) ^[6]. *H. quadripertusus* is associated with keratoconjunctivitis and periorbital papillomatosis and affects the quality of milk and meat production as well as performance of the animal (Kumsa and Bekele, 2008) ^[8]. *H. quadripertusus* is larger than *H. eurysternus* but, smaller than

H. tuberculatus. All three species infest larger ruminant in winter and spring season, however, incidence of *Haematopinus* is abundance in summer (Durden, 2019; Mullen and Durden, 2018) ^[5, 10]. In delayed cases, further complication is occurrence of bot fly myiasis with bacterial infection in biting site will be the major hinderance recovery. Therefore, early diagnosis at genus and species level will help in administration of drugs for quick recovery which reduces unwanted complication in infestation management. Chemotherapy after diagnosis is not so simple, because development of drug resistance against effective drug is major drawback in this advancing world. So, apart from chemical controls, the eco-friendly method like use of essential oils, phyto-compound, biological control and integrated pest management approaches which is following in tick and mite control need be tried in lice control. Generally, reports available about lice are very minimal when compared to other group of parasites in India and also globally due to failures in reporting (Scanni and Bonifazi, 2008) ^[14]. However, they are economically important to veterinary field. Since, its earlier diagnosis, therapeutic, and prevention may decrease the losses that occur due to their infestation.

Conflict of Interest

Not available.

Financial Support

Not available.

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