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Prevalence of *Culicoides* species in livestock farms in relation to season, Namakkal, Tamil Nadu

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Abstract

The study was undertaken to know the prevalence of different species of *Culicoides* in Namakkal (2015-16). The flies were collected during rainy season (Southwest Monsoon: June, July, August and September; North West Monsoon: October, November and December), winter season (January, February) and Summer season (March, April and May) in livestock farms by using UV-light traps from 6pm to 6am. The trap were positioned 1.5-2.0m above the ground level within 25cm in a glass collecting beaker with 200-300ml of water (to which a drop of detergent was added to reduce surface tension) and was placed at the base of each trap. The collected insects were brought to the laboratory and preserved in 70% ethanol. *Ceratopogonids* were first separated from all other insects. *Culicoides* sp. was identified initially based on the wing pattern and confirmed subsequently by mounting parts of the specimen in drop of Canada-balsam on microscope slides after clearing in liquefied phenol solution. A total of 3904 *Culicoides* midges were collected during the study period. The population of *Culicoides* spp. in rainy season was estimated to be 3092 (79.12%), winter season 521 (13.31%) and summer season 291 (7.44%). The highest number of *Culicoides* sp. was found in rainy season whereas low number in summer.

Keywords: *Culicoides*, seasonal prevalence, livestock farms

Introduction

Culicoides (Diptera: Ceratopogonidae) are commonly known as biting/bloodsucking midges or gnats (1-3 mm) presenting a huge diversity and the *Culicoides* genus has more than 1400 species identified worldwide which are obligate blood feeders of mammals and birds including humans. They occur on all land masses except Antarctica and New Zealand (Mellor *et al.*, 2000) [9]. *Culicoides* is very small minute insect and also transmit various diseases like Blue tongue, African Horse Sickness, Ephemeral fever, Epizootic haemorrhagic diseases and some protozoans etc., In India 63 species of *Culicoides* were identified morphologically and their prevalence were reported by many authors *viz.*, Sen and Dasgupta (1962) [4] from Kolkata, Jayalakshmi (1966) [7] from Chennai and Ilango (2006) [6] from Tamil Nadu. The study was undertaken to determine the prevalence of *Culicoides* sp. in livestock farms of VCRI, Namakkal.

Materials and methods

Collection of insects

Seasonal prevalence of *Culicoides* was studied in livestock farms in VCRI, Namakkal, and Tamil Nadu. Tamil Nadu Zone has three seasons *viz.* rainy (June, July, August and September), winter (October, November, December and January) summer (February, March, April and May). In this study the flies were collected UV light traps and a suction fan during rainy, winter and summer seasons for the period of from November 2015 to October-2016. The trap was kept from evening (6 pm) to morning (6 am). A beaker containing 200-300ml of water was placed at the base of each trap (Fig 1). The insects collected using the trap was preserved in 70% ethanol.

Identification of insects

Ceratopogonid flies were first separated from other insects based on morphology. Identification of *Culicoides* sp. was initially done based upon wing pattern using drop of phenol-balsam mixture on microscopic slides after clearing in liquefied phenol solution for 12 h (Wirth and Marston 1967) [14]. Morphological identification of *Culicoides* spp was done by using keys of Wirth and Hubert (1989) [13], Archana *et al.* (2016) [11].

Results

In the current study, a total of 3904 *Culicoides* midges could be collected from livestock farms, VCRI, Namakkal from period of 2015 November to 2016 October (Table 1 & Fig 2). Out of which, 3092 (79.12%), 521 (13.31%) and 291(7.44%) midges could be observed during the rainy, winter and summer seasons respectively. (Table 2 & Fig 3). The highest number of *Culicoides prevalence* was found during the rainy season in contrast to the lower number during summer season. Morphologically, a total of seven different species viz *C. imicola*, *C. oxystoma*, *C. peregrinus*, *C. huffi*, *C. actoni*, *C. innoxius* and *C. anopheles* were found to be prevalent in decreasing orders in the livestock farms at VCRI, Namakkal (Fig 4). During the rainy season, *C. imicola*, was found to be the most prevalent followed by *C. oxystoma*, *C. actoni*, *C. peregrinus*, and *C. anophles* while the other species like *C. huffi* and *C. innoxius* were found in lesser numbers. Likewise, during the winter season, *C. imicola*, was found to be highest followed by *C. oxystoma*, *C. peregrinus*, *C. actoni*, and *C. huffi*. Interestingly, *C. innoxius* and *C. anopheles* could not be found. During the In summer season, *C. oxystoma* was found to be the highest in number followed by *C. huffi*, *C. imicola*, and *C. actoni* and incidentally *C. peregrinus* *C. innoxius*, *C. anopheles* could not be found.

Discussion

In general, the prevalence of insects/ midges in livestock farms is an indirect sign for the possibility of incidence or outbreak of transmissible diseases. The present study was undertaken to determine the prevalence of *Culicoides species* during different seasons of the year. In the present study *Culicoides* sp. collected from the livestock farms of VCRI, Namakkal revealed the existence of the following *Culicoides*

spp viz., *C. oxystoma*, *C. imicola*, *C. actoni*, *C. peregrinus*, *C. anophles*, *C. huffi* and *C. innoxius* in the livestock farms based on the wing patterns. Hence, studies based on the wing pattern can be relied on for the identification of species of *Culicoides*. Among the prevalent species, three *Culicoides spp.*, *C. oxystoma*, *C. imicola*, *C. peregrinus* were found to be the most predominant species which was similar to the findings of Archana *et al.*, (2014) [2].

Moreover, similar observations of the higher prevalence of *C. oxystoma* and *C. imicola* as the most predominant species were also reported by Ganesh Udupa (2001) [5] from Tamil Nadu, Satheesha *et al.*, (2006) [11] from Bidar, Karnataka, and Bhoyar *et al.*, (2009) [3] from Bidar, Mandakanahalli of Karnataka and Jayalakshmi (1966) [7] from Chennai. However, Reddy and Hafeez (2008) [10] reported that *C. oxystoma* was the predominant species in Chittoor and Prakasam districts of Andhra Pradesh. Based on the findings of the present study and authors from the regions of the country, *C. imicola*, *C. oxystoma* and *C. peregrinus* were found to be commonly prevalent *Culicoides* species in the livestock farms.

The present study recorded highest number of *Culicoides* during rainy season and lowest in summer seasons. The reason could be due to less humidity, desiccated temperatures, low rain fall and high air velocity decreased the propagation of *Culicoides* in summer. The present observation is in accordance with Narladkar *et al.*, (1993) [8] who recovered seasonal composition as 75.38% in rainy season, 19.75% in winter and 4.85% in summer. Rainfall played a major role on the prevalence of *Culicoides* as also observed by Dasgupta, (1962) [4] who conducted comprehensive studies on Indian *Culicoides* in and around Kolkata.



Fig 1: Collection of *Culicoides spp.* and other flies using light trap in livestock farms

Table 1: Month wise prevalence of *Culicoides species* in livestock farms

Year 2015-2016	Nov-2015	Dec-2015	Jan-2016	Feb-2016	Mar-2016	Apr-2016	May-2016	June-2016	July-2016	Aug-2016	Sep-2016	Oct-2016	Total
No. of <i>Culicoides</i>	2248	567	368	151	65	124	102	48	35	31	27	138	3094

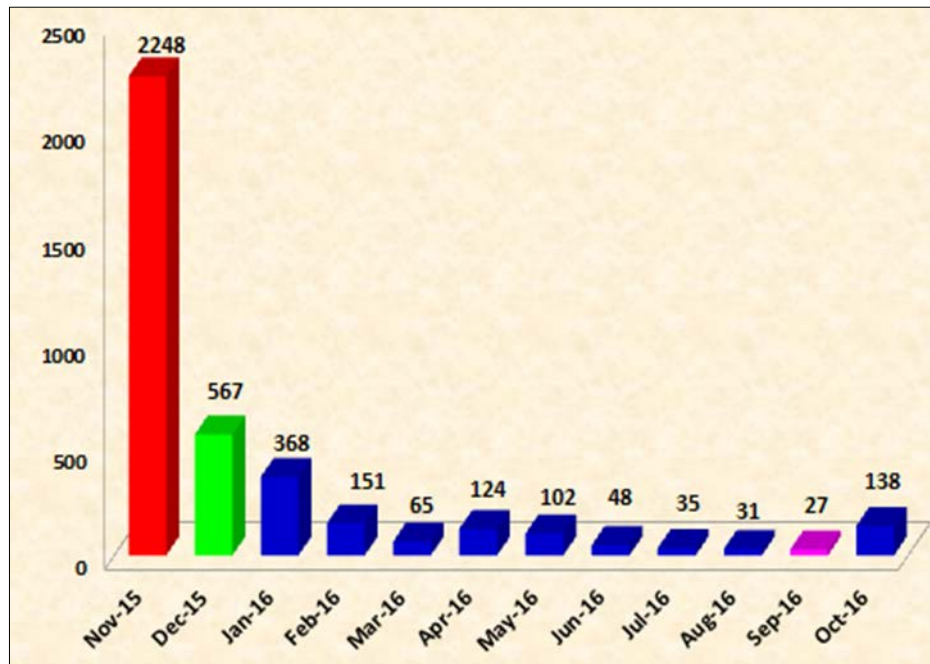


Fig 2: Month wise prevalence of *Culicoides* species from November-2015 to October-2016 in livestock farms

Table 2: Season wise distribution of different species of *Culicoides*

Species	Rainy	%	Winter	%	Summer	%	Total	%
<i>C. oxystoma</i>	552	14.13%	112	2.86%	236	6.04%	900	23.05%
<i>C. imicola</i>	1518	38.83%	305	7.81%	17	0.43%	1840	47.13%
<i>C. actoni</i>	535	13.70%	37	0.94%	13	0.33%	585	14.98%
<i>C. peregrinus</i>	253	6.48%	37	0.94%	0	0	290	7.42%
<i>C. huffi</i>	6	0.15%	30	0.76%	25	0.64%	61	1.56%
<i>C. innoxius</i>	4	0.10%	0	0	0	0	4	0.10%
<i>C. anopheles</i>	224	5.73%	0	0	0	0	224	5.73%
Total	3092	79.12%	521	13.31%	291	7.44%	3904	

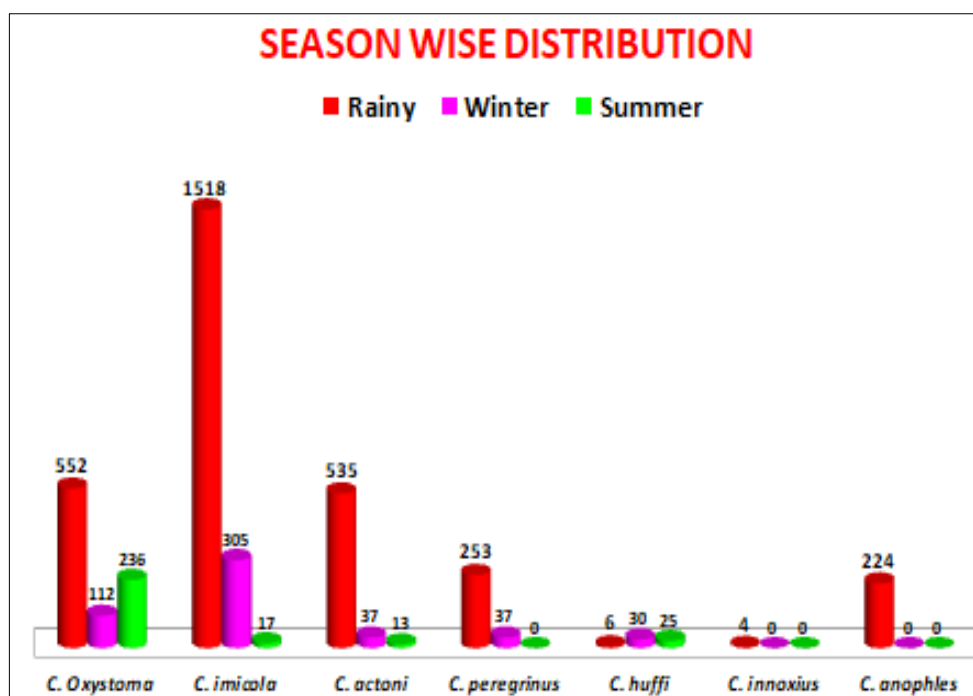


Fig 3: Season wise prevalence of different species of *Culicoides*

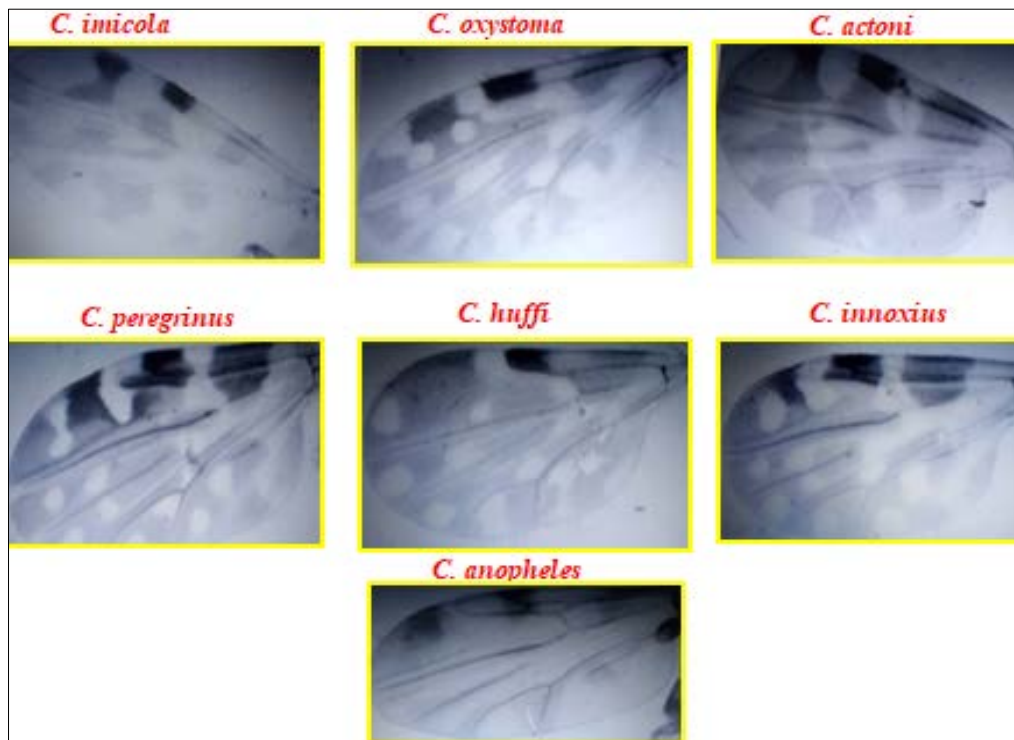


Fig 4: Identification of different species of *Culicoides* based on wing patterns

Conclusion

The findings of the present study describes seven species of *Culicoides* viz., *C. imicola*, *C. oxystoma*, *C. peregrinus*, *C. huffi*, *C. actoni*, *C. innoxius* and *C. anopheles* as the prevalent species in livestock farms of VCRI, Namakkal. The highest prevalence was noticed during rainy season and lowest in summer season reiterates the seasonal influence in its population. The prevalence of highest number of *Culicoides* might have an influence on the incidence of vector borne diseases like Blue tongue etc., among the farm animals.

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References

1. Archana M, Placid E, Souza D, Renuka Prasad C, Byregowda SM. Prevalence of different species of *Culicoides* in Bangalore rural and urban districts of South India. *J Parasit Dis* 2016;40(3):591-604.
2. Archana M, D'Souza PE, Renuka Prasad C, Byregowda SM. Seasonal prevalence of different species of in Bangalore rural and urban districts of South India, *Veterinary World* 2014;7(7):517-521.
3. Bhoyar R, Udupa KG, Thimma Reddy PM, Madhava Prasad CB, Kasaralikal VR. Role of climatological factors and its association with abundance of *Culicoides* midges (Diptera: Ceratopogonidae). In: *Compendium XIX national congress of veterinary parasitology and national SYMPOSIUM on "National impact of parasitic diseases on livestock health and production"*. Department of Veterinary Parasitology, College of Veterinary Science, Ludhiana 2009.
4. Dasgupta SK. Some *Culicoides* of Calcutta and the neighbouring areas. *Sci cult* 1962;28(11):537-539.
5. Ganesh Udupa. *Culicoides* spp. (Diptera: Ceratopogonidae) associated with livestock and their relevance to bluetongue infection in Tamil Nadu. PhD Thesis submitted to Tamil Nadu Veterinary and Animal Sciences University Chennai, Tamil Nadu, 2001.
6. Ilango K. Bluetongue virus outbreak in Tamil Nadu, southern India: Need to study the Indian biting midge vectors, *Culicoides* Latreille (Diptera: Ceratopogonidae) 2006;90(2):163-167.
7. Jayalakshmi. Investigation on some dipterous vectors and parasites. PhD thesis submitted to TANUVAS, Chennai, India 1966.
8. Narladkar BW, Shastri UV, Shivpuje PR. Studies on *Culicoides* spp (Diptera, Ceratopogonidae) prevalent in marathwada region (Maharashtra) and their host preferences. *Indian Veterinary Journal* 1993;70(2):116-118.
9. Mellor PS, Boorman J, Baylis M. *Culicoides* biting midges: Their role as Arbovirus Vectors. *Annu. Rev. Entomol* 2000;45:307-340.
10. Reddy CVS, Hafeez M. Studies on certain aspects of prevalence of *Culicoides* species. *Indian J Anim Sci* 2008; 78(2):138-142.
11. Satheesha SP, Udupa KG, Labuschagne K, Prasanna Kumar S. Temporal abundance of *Culicoides* species near the sheds of domestic animals and their possible implication on transmission of Bluetongue. In: *National seminar on strategies for control of bluetongue*. Department of Veterinary Microbiology, Tirupati 2006.
12. Sen SK, Fletcher TB. *Veterinary Entomology and Acarology for India*, 1st Edn. ICAR, New Delhi 1962, 98-120.
13. Wirth WW, Hubert AA. The *Culicoides* of Southeast Asia (Diptera: ceratopogonidae) *Mem. Amer. Ent. Inst.* no 44. 1989.
14. Wirth WW, Marston N. A method for mounting small insects on microscope slides in Canada balsam *Ann. Entomol. Soc. Am* 1967;61:783-78.