

Biodiversity of Mites in Poultry Dust at Rajnandgoan District in Chhattisgarh, India

Damle K.L.¹, Gupta S.² and Sharma M.¹

¹Govt. Digvijay College, Rajnandgaon, C.G., Jaipur Institute of Biotechnology, Maharaj Vinayak Global University, Jaipur, India

²Department of Zoology, Govt. Science College, Raipur, C.G., Pt. R.S.U. Raipur, India
majorkld12@gmail.com

Available online at: www.isca.in, www.isca.me

Received 23rd May 2015, revised 26th March 2016, accepted 31st May 2016

Abstract

Mites are parasites on plants, animals (Invertebrate and Vertebrate) including humans. The biodiversity of poultry dust and variation in different seasons study was carried out. About 450 samples were screened for two years from poultry farm located at Ghorda, about 12 kilometers away from Rajnandgaon District, state Chhattisgarh, India. Simple pick up method for qualitative, and centrifugation method for quantitative estimation of mites was performed. Two species of mites *Dermanyssus gallinae* (48%), *Dermatophagoides pteronyssinus* (20%) and *Ornithonyssus bursa* (09%) revealed in between June 2012 to May 2014. The temperature and relative humidity directly affected the mite incidence. Poultry dust mites found peak in August to September during the study year, when temperature was around 30^o and relative humidity between 75^o to 85^o. Protonymphs and Duetonymphs larvae of chicken mite's incidence were also found.

Keywords: Ghorda, Allergy, Species, Poultry Mites, Humidity.

Introduction

Mites are of cosmopolitan distribution. They are free to parasites found everywhere on plants, animals (invertebrate and vertebrate) including humans. They belong to the largest phylum Arthropoda, order Acarina of subclass Acari and class Arachnida¹, without neck, microscopic, around 300-500 microns in length and 100 microns in diameter, oval, opaque or transparent or variously colored, preys, predators or parasites, terrestrial or aquatic, contaminants or free-living bio-control agents, decomposers decomposing various organics matters or dead parts of plants and animals helping the recycling of materials in an ecosystem. They are also allergens in sensitive individual human beings². Sometimes they are parasites causing diseases in human beings, animals or plants³, and they are vectors carrying diseases from place to place.

In the world about 36 species of house dust mites are found, out of which 29 have been reported from India. 17 species from Kerala and 20 from Maharashtra⁴. Approximately 30,000 known species of mites are soil dwellers⁵⁻⁷. Further investigations of house dust mites have revealed different groups of mites like animal mite, cat mite, rat mite, pig mite, cattle mite, poultry mite, etc.

Some house dust mites found in the poultry dusts are allergens causing allergy in sensitive human beings and animals. Some of them have also been found to cause diseases in poultry birds and poultry workers⁸, and create ecological imbalance in nature. It may result into aerobal pollution problems. Distribution of house dust mites, growth and development, and allergy

causation due to mites in the individuals is greatly influenced by various factors like types of dwellings, temperature and relative humidity. In India three seasons are visualized, which exhibit three different environmental parameters which effect the percentage contribution of dust mites greatly.

Dust mites have drawn worldwide attention including India because of their economic importance. All round efforts were made in India to explore the mite fauna from different geographical region and diverse environments. Unfortunately, no work has been done in Chhattisgarh state. That's why diversity of dust mites in different habitat was planned for this study. To study the environmental parameters of poultry dust mites, work on biodiversity of mites in poultry dust was carried out at Rajnandgaon. So far no work has been done in poultry mites as well as house dust mites in Rajnandgaon district rather Chhattisgarh State region around hence this experiment was carried out.

Materials and Methods

To study the biodiversity of poultry mites, a general study was carried out from June 2012 to June 2014. A regular record of temperature and relative humidity was maintained for one poultry farm at village Ghorda, at Rajnandgaon District in Chhattisgarh State in India. This poultry farm is surrounded by agricultural land. Poultry dust was collected twice a month. About 450 samples were collected twice a month from the different corners and the central part of the farm, sieved through a sieve sized 300 meshes⁹. Isolation of mites was done by simple pickup method. The sieved dust was placed in Petri dish.

Permanent slides were prepared in melted glycerin jelly by direct picking up the mites by a needle dipped in lactic acid and observed under Stereoscopic Binocular Research Microscope for identification.

For quantification of mites centrifugation method was adopted which was used at Bangalore using carbon tetrachloride and kerosene oil. The mites were identified according to the key given by different authors from time to time and available updated literature¹⁰⁻¹⁴.

Results and Discussion

Observations and Discussions: About 450 samples were screened and the population of mites was observed. After screening, three species of mites *Dermanyssus gallinae* (48%), *Dermatophagoides pteronyssinus* (20%) and *Ornithonyssus bursa* (09%) were found in poultry dust during these studies (Figure-1).

Mites showed variation round the year. They were found significantly high from August to October, moderate in November to January, comparatively less from February to March and very few or practically nil from April to June. This monthly variation in mite incidence indicates that environmental conditions of mites vary seasonally. Thus our findings revealed that low relative humidity, high temperature, extremely cold condition and rainless days act as adverse condition for the

incidence and growth of mites. Under these conditions, the mite population was significantly decreased between November to March comprising autumn and winter season.

The average results for monthly concentration of poultry dust mite revealed peak in autumn season during the year (Figure-2), when temperature was around 30° and relative humidity ranged between 75 % to 85 %. Thus showing seasonal variation. Temperature and relative humidity directly affected mite incidence¹⁵.

Conclusion

No work has been done on poultry mites and house dust mites in Rajnandgaon District, Chhattisgarh state region concerning the types of mites found in the poultry dust. In this study we performed identification and presence of different types of mites in the poultry dust for two years. During this study three mite species *Dermanyssus gallinae* (48%), *Dermatophagoides pteronyssinus* (20%) and *Ornithonyssus bursa* (09%) were found in poultry dust. It was found that moderate temperature and high relative humidity provided most congenial environment for maximum percentage contribution of mites in poultry dust. Relative humidity effects the population of mites¹⁶, whereas low temperature and high temperature were found unfavorable for the survival of mites as is revealed in cold dry winter months and hot summers of April and May¹⁷. Thus the population of mites shows variations in different seasons.

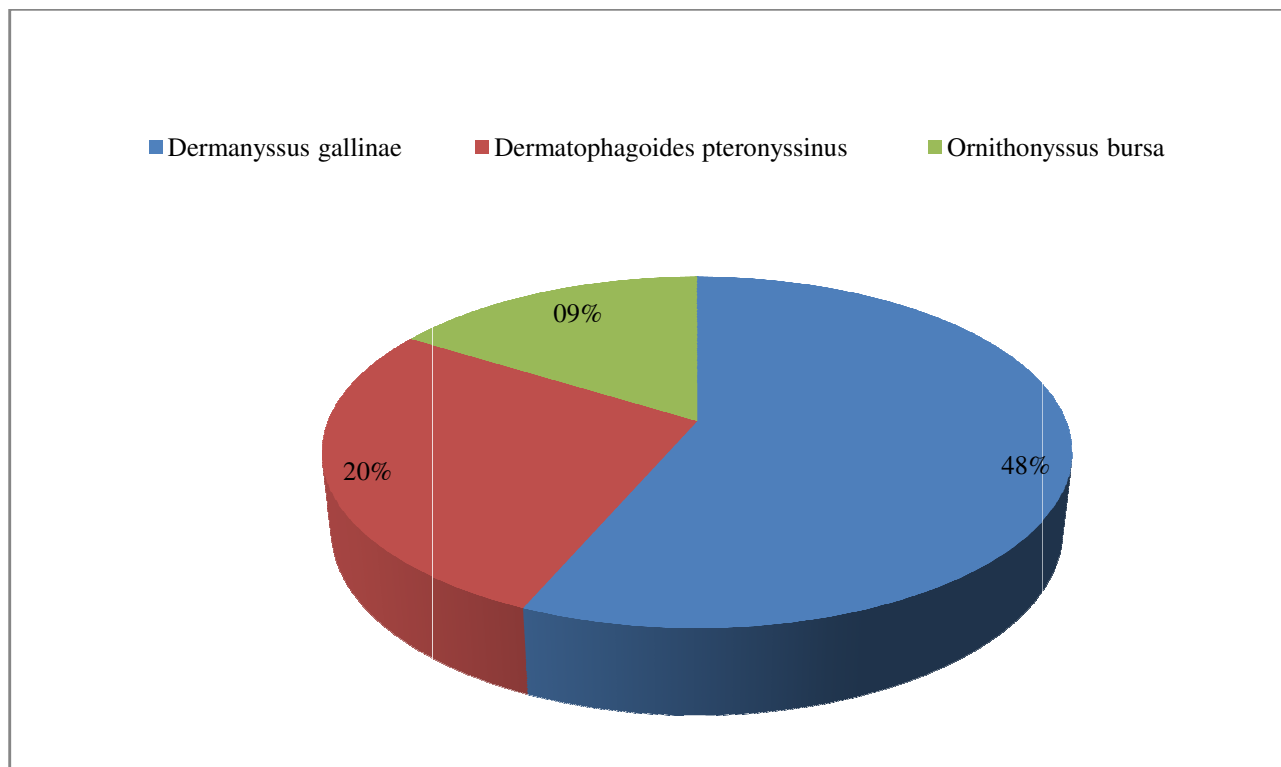


Figure-1
Percent of Poultry dust mites found

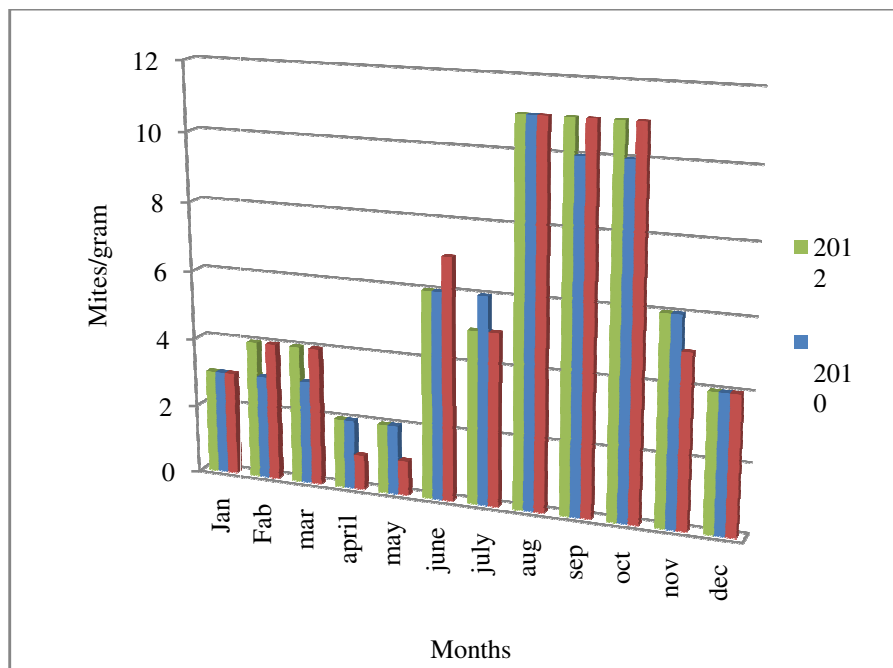


Figure-2
Variation of Poultry dust mites during research period

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