Type of paper: Researchsoft tick (*Argas persicus*) Infestation at government layer farms of Pothwar region of Punjab, Pakistan

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Abstract

*Argas persicus* is a soft tick which infesting poultry globally. The present study was conducted in three districts of Pothwar region of Punjab Pakistan to determine the prevalence/distribution of *A. persicus* in white leghorn layer during 2010-2011 at government layer farms. Simple random sampling technique was applied for the collection of soft ticks. A total of 12772 ticks were collected from white leghorn layers. All the ticks were identified as *Argas persicus*. Higher prevalence of *Argas persicus* was observed in summer while lowest in the winter season. Government layer farms needs improvement in hygienic conditions to acquired better growth and production from white leg horn layer.

Keywords: *Argas persicus*, Soft tick, White Leg Layer, Pothwar Region, Pakistan

1. Introduction

Poultry industry is among the leading industries of Pakistan. This fast growing industry support country economy by providing jobs. Share of poultry industry in country GDP is 1.2% [5]. Ticks are ecto-parasite of wide range of animals also infest poultry around the globe. To this end, among ticks, *Argas persicus* which is soft tick has been reported as common poultry tick across the world from Africa [20], Asia [3, 4], Europe and America [1].

Ticks affect poultry directly by sucking blood instigating anemia, weight loss, and reduced egg production [11]. Reported that 18.57 mL of blood has been sucked by individual tick in a day. In addition, bite of *A. persicus* may cause motor paralysis or volunteer muscle paralysis [2]. Further, lowering resistance thus triggers mortality in case of heavy infestation [8, 10, 18] , or indirectly play role as vector of transmitting several pathogens that causing deadly diseases in poultry. Ticks inflict adverse effect on poultry health and welfare around the globe, thus consider as major threat for poultry production. Pakistan being a tropical country provides optimum climatic conditions which favour tick growth and multiplication [7]. There are several reports have been published and revealed that Pakistan has great fauna of both hard and soft ticks. However, these published reports concentrates on significance of hard tick which infested livestock species across the country as compared to soft ticks [10, 11, 22]. On the other hand studies regarding soft tick infestation in poultry are scanty [10, 22] at country level. Therefore, the present study aimed to screened government poultry farm located in potohar region of Punjab Pakistan for the frequency distribution of soft tick infestation in poultry.

2. Materials and Methods

2.1 Study Area

The present study was conducted during the year 2010-11 in three districts of Punjab including, Rawalpindi, Jhelum, and Attock known as Pothwar region of Pakistan because of potohari language spoken by the native peoples predominantly and its physical features.

2.2 Screening of Poultry Farms and Collection and Identification of Ticks

Layer farms located in three selected districts were randomly visited in a month during study period of one year for collection of ticks. Ticks were collected from farms sites including walls, pillars, nests, cracks and crevices. All these sites were searched for finding of all ticks stages including nymph, larvae and adult. Likewise, layers present at the farms at the time of visit were randomly captured and searched for the presence of ticks on their wings, legs, neck,
head, and other body parts for the collection of ticks. Layers found positive were hold in such position that put little stress on the birds and ticks were collected very carefully through forcep. All the collected ticks were store in separate macorntry bottle contains 70% alcohol as preservative and for easy transportation. All the collected tick specimens were then transported to the Parasitology, Laboratory, Department of Zoology, University of Arid Agriculture, Rawalpindi, Punjab Pakistan for identification and record. Ticks were identified on the basis of morphological keys [10] and [26].

![Physical Map of Potohar Region, Punjab, Pakistan](image)

2.3 Statistical Analysis
Data was entered into Microsoft Excel Spread Sheet for statistical analysis and analyzed through SAS version 10. Prevalence was calculated and chi-square test was used to test statistical significant difference at (P<0.05).

3. Results
A total of 12772 ticks were collected from layers and different sites of farms from three district of Punjab Pakistan including; Rawalpindi (2923), Jhelum (3536), and attok (6313) with incensing trend respectively. All the collected ticks were identified as adult A. persicus (Fig.1 and 2) on the basis of their morphological feature. (Fig.3) showing presence of A.persicus on feathers of white leg horn layers. During the present study an overall prevalence 8.33% of A. persicus was recorded from these three study district of Potohar region of Punjab, Pakistan. During the period of present study significantly (P<0.05) higher prevalence (24%, 16.9% and 12.3%) of A. persicus was observed in the month of May and June (Summer season) from these three studied districts respectively (Fig. 4a, b). While, lowest prevalence (4.8%, 2.8% and 4.2%) was recorded in the months of February (Winter season) in these districts of Punjab Pakistan (Fig. 4a, b). However, There was in-significant (P>0.05) difference observed in overall prevalence of A. persicus infesting layer at government layer farms of selected districts of Potohar region Punjab, Pakistan.

4. Discussion
In past numbers of studies have been focused on epidemiological aspects of hard tick infestation in livestock as compared to poultry throughout Pakistan. However, no research work has been done so far in the study area regarding situation of poultry tick infestation rate and distribution. The present study is first report from the study areas. Previously published reports representing that A. persicus found most prevalent soft tick infesting poultry across the globe including Pakistan [11]. A. persicus is important poultry (fowl tick) as it act as vector of pathogens [6] that causes several devastating diseases to poultry/chickens [14]. Prevalence of ticks in any part has been found associated with some of factors that favour ticks survival and growth including; areas topography, rain fall pattern, relative humidity, atmospheric temperature, seasons, husbandry and or managmental practices. These enisted factors influence occurrence of ticks in any area. During the present study single species of soft ticks A. persicus was identified. Various investigator from different parts of the world reported that this is most common soft ticks species found infesting backyard as well as commercial poultry around the globe [2, 13, 15, 19, 22, 25]. However, some researcher reported that other soft tick species has also been found infesting poultry [12, 13, 19, 22]. Both lower [15, 22], higher [23, 24] and comparable [25] prevalence % of A. persicus have been reported [18, 21]. Seasonwise higher prevalence of soft tick was observed in summer season followed by spring, autumn and winter in decreasing trend. However, [19] reported higher prevalence in spring and lower in summer. [9] reported that the maximum occurrence of A. persicus in rainy season. Whereas [13] reported that winter is most suitable season for soft ticks reproductive. Although, in winter A. persicus had displayed minimum activity. This difference in % prevalence of A. persicus might be due to the variation in landscape of the study area and environmental/climatic factors described above associated with prevalence of ticks. This variation in prevalence of A. persicus in three studied districts associated with factores including; Relative humidity %, Temperature 0C and topography of the studied districts. (Fig. 4a,b) representing association of A. persicus prevalence with the fluctuation of these environmental factors. Results of present study are in concordance with the findings of [8, 17, 18, 22] who have reported that temperature has positive correlation with ticks population density as compared to humidity. It is evident from data that high temperature favors maximum population density of poultry ticks while lower temperature and humidity level does not provide better conditions for poultry ticks and hence decrease their population in colder months. Besides these other factors including; birds density (crowding), farm management [23], use of acaricides [21] hygenic conditions [15] of farms also influence prevalence of tick infestations. Occurrence of soft tick on these study sites may also be associated with presence of rodents and wild birds around farm premises. Birds act as potential source and reservoir host for exchange of ectoparaite among other avian species [2]
All birds screened for recording of prevalence of soft ticks were white leghorn (WLH) laying hens [22]. reported that 12.7% of the WLH were infested with this tick species in faisalabad which indicatted that WLH are sussusceptible to this soft tick. Hens are considred as main host of A. persicus [13]. Although prevalence of A.persicus recorded during present survy was not very high means, it has no impact on poultry production of the area. There is need of assessment of economic losses due to soft tick infestation.

5. Conclusion and Recommendations
Soft tick species A. persicus is prevalent in the study area which shows that area landscape and climatic factor are conducive for this tick specie survival and propagation. Better managemnet and proper screening of poultry (layer) particullarily during summer season can minimize distribution and abundance of A. persicus from the study area located government layer farms.
6. Acknowledgement
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Fig 1: Ticks colony at laying nest of layers;

Fig 2: Soft tick (A. persicus) at farms walls.

Fig 3: Argas persicus larvae attached with feathers of white leg horn layers.

Fig 4a: Association of Metrological Factors (Temperature & Humidity) with prevalence of Poultry soft tick A. persicus in three districts of powther region of Punjab Pakistan.

Fig 4b: Seasonal prevalence of Argas persicus in three selected districts of powther region of Punjab Pakistan.
7. References