Prevalence of *Argas persicus* in rural poultry at Lodhran, Pakistan

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**ABSTRACT**

Tick (*Argas persicus*) is a major external parasite responsible for low productivity in rural poultry but it is not in focus for research in Pakistan. The prevalence of *A. persicus* in rural poultry at Lodhran, Pakistan has been determined in the present study and the efficacy of various acaricides for its control has also been studied. Out of 7720 ticks collected from 600 birds, 4378 (56.71%) belonged to *A. persicus*, 2095 (27.14%) to *A. reflexus* and 1247 (16.15%) ticks to *A. vespertilionis*. Prevalence of *A. persicus* was the highest. Sera samples, 600 in number, were analyzed for the presence of anti-*A. persicus* antibodies by Agar gel Immuno-diffusion test using mouth parts of ticks (*A. persicus*) as antigen and only 21.5% were found sero-positive. Prevalence of Anti-*A. persicus* antibodies was higher in adult poultry birds (19.5%) than in young chicks (9.08%). The highest prevalence was recorded during spring (20.9%) perhaps due to high humidity, whereas in summer its prevalence was 9.1%.

**Key words:** Poultry, *Argas persicus*, Ticks, Acaricides, Prevalence.

**INTRODUCTION**

In villages of Pakistan, rural poultry is raised to fulfill the egg requirements by poor people. Desi poultry contributes 60.02% of total eggs and 36.4% of meat production (Ashraf et al., 2003). Poultry’s external parasites (ticks, lice and mites) play a pivotal role in the transmission of pathogens and cause tremendous economic losses (Pavlovic et al., 1989; Iqbal et al., 2003).

Prior to 1963 native breed "rural poultry" was raised for the maximum egg production of 73 eggs per year, under local conditions and circumstances. "Lyallpur Silver Black", an improved breed, was evoked in 1965-66, in the Department of Poultry Husbandry, University of Agriculture, Faisalabad. Rural poultry have the capacity of producing 70-80 eggs per year in ideal conditions, whereas the layers of "Lyallpur Silver Black" breed are capable of producing 150 eggs/year. This breed has the ability to gain 0.98 kg weight at six month of age under favorable managemental and feeding conditions provided to birds (Ashraf et al., 2003).

The external parasites of poultry produce losses by sucking blood and cause irritation resulting in reduced production of eggs in layers (Phulan et al., 1984; Pavlovic et al., 1989). Among the external parasites, tick infestation causes heavy blood loss which may lead to anemia and death. *Argas persicus* burden was 3.25 per bird and a single tick sucked 18.57 ml blood daily and thus 60.0 ml
of blood is sucked by ticks per bird daily (Khan 2001). *Argas persicus* life cycle involves one larval and at least two nympha stages prior to adult. Ticks, living in the cracks and crevices of the farms buildings, approach birds at night to suck blood. *Argas persicus* transmits *Borrelia anserina* which is the causative agent of fowl Spirochaetosis (Telmadarray et al., 2007).

Mostly, the ticks are found in warm areas, their larvae hatch in spring to autumn, and moulting and reproduction occurs chiefly in July and August. The infestation percentage of *Argas persicus* in Lahore was 14.47% and 14.7% prevalence of ticks infestation was found in private poultry farms located in Faisalabad (Khan, 2001). Ticks are more prevalent in adults as compared to youngs (Permin et al., 2004). *Argas persicus* is mostly prevalent during the spring season and is correlated with temperature and high humidity (Phulan et al., 1984).

**MATERIALS AND METHODS**

In this study a total of 600 indigenous rural poultry at Lodhran (Pakistan) was screened for the prevalence of *A. persicus*. Ticks were collected for studying seroprevalence. Serum samples of these birds were collected and analyzed for the presence of anti-tick antibodies by Agar Gel Immunodiffusion test (AGID).

Ticks and their larval stages were collected from indigenous poultry and from crevices, walls of farm, windows and doors of buildings. After collection ticks were kept in glass jar for 6 to 24 hours and then placed in a container having 70% alcohol before being transported to the Department of Parasitology, University College of Veterinary & Animal Sciences, The Islamia University of Bahawalpur. Average load of tick per bird was calculated.

Fifty (50) ticks randomly selected were boiled in distilled water for 10 minutes, and then dipped in 10% KOH solution. Ascending order of Alcohol was used for dehydration purpose. Ticks were passed through different grades of alcohol, viz., 30, 50, 70, 92 and 100% (absolute). The ticks were kept for 30 minutes in each grade. Then fixed, dehydrated and mounted by using DPX (Soulsby, 1982).

Identification of ticks was done on the basis of their taxonomic characteristics (Shah et al., 2006). Morphological features used in tick identification were: size of tick, shape of body, position of head and mouthparts (*capitulum*) relative to the thorax and abdomen on dorsal and ventral sides (Shah et al., 2006).

**ANALYSIS OF SERA BY AGID TEST**

Immunological changes in chicken are investigated by monitoring anti-tick antibodies. The immunological techniques used for measurements of anti-tick antibody titers in chicken are Enzyme Linked Immunosorbent Assay (ELISA) (Chandel et al., 2003). Agar Gel Precipitation Test (AGPT) and ELISA used for the detection of anti-tick antibodies (Komala et al., 2008). IHA Indirect Haemagglutinating test as used by Hussain et al. (2003).

Blood samples from 600 birds were collected aseptically from same rural poultry units from where ticks were collected. Blood samples were collected from the wing vein using disposable syringes without anticoagulant and kept at the
slant position for separation of serum from blood. Sera, thus collected, were centrifuged at 1000 rpm for 15 minutes to remove cellular debris and stored at -20°C till further use (Alkhalaf, 2009). Ticks belonging to *A. persicus* were used to prepare tick antigen as per method described by Cruz et al. (2008).

Rural poultry birds (05) were kept for raising of hyper immune serum. These birds were exposed to the heavy tick infestation. Birds were kept in experimental shed for 15 days under the normal environmental conditions. Birds were slaughtered and blood was collected in test tubes without adding anticoagulant and serum was separated as described earlier.

AGID (Agar Gel Immunodiffusion) test was performed to analyze the sera samples, 600 in number, collected from rural poultry for the presence of anti-tick (*A. persicus* only) antibodies following the protocol of Komala et al. (2008). Noble agar (0.9 gram), Sodium chloride (0.85 gram), and Sodium Azide (0.001 gm) were dissolved in distilled water (100 ml), in a flask, heated with intermittent shaking till the noble agar was dissolved completely and poured in Petri dishes (thickness of 2.8mm). Wells were punched using gel puncher and bottoms of the wells were resealed by a drop of melted agar. Central well was filled with anti-tick antigen (30 micro liter) and surrounding wells with field serum samples. Reaction between tick antigen and raised hyperimmune serum was used as known positive control. Plates were incubated at 37°C in the presence of moisture 60-70 % for 48 hours. Formation of white precipitation line between central (antigen) and surrounding wells (antibodies) was considered as positive test (Chandel et al., 2003). All the field sera were evaluated and results recorded.

**STATISTICAL ANALYSIS**

Data were analyzed statistically by using Kruskal Wallis, NPar test and Median test (Steel & Torrie, 1982).

**RESULTS AND DISCUSSION**

Out of a total of 7720 collected ticks, 4378 (1751 larvae and 2627 adults) belonged to *A. persicus*, 1247 (499 larvae and 749 adults) to *A. reflexus* and 2095 (838 larvae and 1257 adults) belonged to *A. vespertilionis* (Table 1). Out of 7720 ticks collected from 600 birds, at each subunit percentages of *A. persicus*, *A. reflexus*, *A. vespertilionis* were calculated to be 56.71%, 27.14% and 16.15% respectively.

Out of a total of 600 blood samples, 129 were positive so the percentage of *A. persicus* infection recorded in rural poultry was 21.5%. The highest percentage of *A. persicus* was recorded during spring (20.9%) whereas the lowest (9.1%) in summer. It was noted that prevalence of Anti-*A. persicus* antibodies was higher in adult poultry birds (19.5%) than in young chicks (9.08%). *A. persicus* is a common ectoparasite of chicken, mainly in commercial layer and Desi birds. AGID test was used for the detection of antibodies in the serum of infested poultry which was also used by Chandel et al. (2003) and Komala et al. (2008). Among different species of *Argas* ticks: *A. persicus; A. reflexus*, and *A. vespertilionis* were 56.71%, 27.14% and 16.15%, respectively. Vatandoost et al. (2003) reported two genera of ticks in poultry namely *Argas* and *Ornithodoros*, among which 52.3% were *Argas persicus*, 2.6% *A. reflexus*, 2%
Ornithodoros canestrinni, 41.4% O. lahorensis, and 1.77% O.tholozani. Shah et al. (2006) observed that overall prevalence of A. persicus is 19.4% and A. persicus = 56.71%, Argas reflexus = 27.14%, Argas vespertilionis = 16.15% in Faisalabad. Khan (2001) and Mir et al. (1993) reported 14.7% and 23.6% prevalence at Faisalabad and Kashmir valley, respectively. Buririo (1983) observed that there was 72% rate of infection in ticks present in backyard poultry units. Phulan et al. (1984) found A. persicus to be the only species in Hyderabad. Permin et al. (2004) reported that the prevalence was 6%
and 14% in chicks and adults, respectively, at Goromonzi District, Zimbabwe. Biu et al. (2007) reported 15.7% prevalence of *A. persicus* in young and 14.2% in adult chicks in Nigeria.

Season-wise prevalence of *A. persicus* recorded during the current study showed higher prevalence during the spring season and low during the summer season. This showed that prevalence was more dependent on humidity as compared to temperature. Phulan et al. (1984) recorded the highest rate of ticks infestation in poultry during August and this rate is positively correlated with temperature as compared to humidity. According to Nosek et al. (1980) the larvae of *A. persicus* moulting occurs chiefly in July and August while ticks develop and reproduce during warm season. Gueye et al. (2006) reported the highest occurrences of *A. persicus* during rainy season.

**REFERENCES**


