

## ARGAS PERSICUS INFESTATION: PREVALENCE AND ECONOMIC SIGNIFICANCE IN POULTRY

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The overall prevalence of tick infestation was 14.7 % on commercial layers (n = 12000) examined from different private poultry farms located in district Faisalabad. Only one species, *Argas persicus*, was identified from the infested birds. Tehsil-wise prevalence was 8.2, 23.5 and 12.5 % in Faisalabad, Samundri and Jaranwala, respectively. Economic loss due to blood sucked by *Argas persicus* infestation on commercial layers has also been estimated. *Argas persicus* burden was 3.25 per bird and a single tick sucked an amount of 18.57 mg blood daily and 0.06 g per bird. Total amount of blood sucked annually from the existing layer population was 14,17,706 kg resulting into an annual loss of rupees 2.13 million.

Key words: economic significance, layers, prevalence of *Argas persicus*

### INTRODUCTION

The population of Pakistan is increasing rapidly and this trend reflects that the demand of animal protein will continue increasing proportionately. Under these circumstances, poultry may be the only readily available and an economic source of animal protein to bridge the gap between supply and demand of animal protein. It has been estimated that this sector caters more than 10 % of the total demand of animal protein in the country (Akhtar, 1984). Ticks can transmit certain diseases such as fatal anaemia (Lucas, 1954), spirochaetosis, tularaemia, aegyptianellosis and encephalitis (Philip, 1963) resulting in heavy losses to the poultry industry. In addition, tick infestations may cause heavy mortality by sucking blood and causing irritation to the birds which consequently affects the economical production of poultry (Edgar and King, 1950). Much attention has been given to treat these conditions, while parasitic infestations particularly tick problems have remained neglected.

In the past, less interest has been shown to investigate the prevalence and economic significance of the tick infestation on poultry in monetary terms. This paper describes the prevalence and estimated economic losses due to blood sucking by *Argas persicus* infestation on commercial layers.

### MATERIALS AND METHODS

**Collection and Identification of Ticks:** Commercial layers (n = 12000) about 40-50 weeks of age from three tehsils of Faisalabad viz. Faisalabad, Jaranwala and Samundri (4,000 each) were examined from different private poultry farms for the collection of ticks. Ticks and nymphs were carefully removed from the body of the birds by gently pulling them out, trying to avoid decapitation of the heads and preserved in chloroform solution prepared in 10 % formalin (Soulsby, 1982). The ticks were permanently mounted (Khan et al., 1993) and identified (Kaiser and Hoogstraal, 1964; Soulsby, 1982).

**Determination of Tick Burden:** Tick burden per bird was determined by examining 100 commercial layers from different private poultry farms located in district Faisalabad.

The tick burden was later used for the estimation of economic losses as incurred due to blood sucking by the ticks.

**Determination of Economic Losses:** Adult ticks were collected from the birds and brought to the laboratory of the Department of Veterinary Parasitology, University of Agriculture, Faisalabad. The ticks were kept off feed for about 24 hr. Twenty ticks were selected at random and weighed with a sensitive electronic balance and attached to the thigh and under the wings of experimental birds (n=20). The ticks were removed after 24 hr and weighed again and repeated this exercise five times with the same ticks and difference in blood sucked was calculated. The information concerning price of blood meal used in manufacturing the poultry feed was obtained from ten poultry shops to determine the price of per kg of blood meal. This price index was later used to calculate the blood losses in terms of rupees (Iqbal, 1971).

### RESULTS AND DISCUSSION

An overall prevalence of tick infestation was 14.7 % in three tehsils of district Faisalabad. Only one species, *Argas persicus*, was identified from the infested birds. Tehsil-wise prevalence was 8.2 % in Faisalabad, 23.5 % in Samundri and 12.5 % in Jaranwala. These figures showed that the highest prevalence of tick infestation was in tehsil Samundri (23.5 %) followed by Jaranwala (12.5 %) and Faisalabad (8.2 %). Statistically, there was a highly significant difference in the prevalence of *Argas persicus* infestation among the three tehsils of district Faisalabad. The prevalence of *Argas persicus* was reported as 16.0 (Iqbal, 1971); 10.9 (Singh and Chhabra, 1973); and 20.0 % (Chhabra and Donora, 1994) from different areas of the world. The prevalence of *Argas persicus* has been reported from different countries of the globe such as USA, Egypt, Iran, South Africa, India, Czechoslovakia, China, Israel, Yugoslavia and Zimbabwe. The various species of genus *Argas* have been identified from the infested poultry from different parts of Pakistan. For instance, Lahore and

Sheikhupura (Abdussalam and Sarwar, 1953); Lyallpur, Lahore and Sheilhpura (Sheikh and Barya, 1968); Sindh (Buriro, 1982) and Kashmir (Mir et al., 1993).

Only a single species of Argasid tick, *Argas persicus*, was identified from the commercial poultry birds. There have been reports of other species of genus *Argas* like *Argas reflexus*, *Argas reflexus hermanni* and *Argas cooleyi* (Hoogstraal and Kohls, 1960a); *Argas reflexus reflexus* and *Argas neglmei* (Kohls and Hoogstraal, 1961); *Argas lagenoplastis* (Kohls and Hoogstraal, 1963); *Argas reflexus* (Rafyi and Maghami, 1965); *Argas reflexus*, *Argas vulgaris filippova*, *Argas vespertillionis* (Dusbabek and Rosicky, 1976); *Argas radiatus* and *Argas abortus* (Hofstad et al., 1984); *Argas hermanni* (Oyoum et al., 1990) and *Argas reflexus* (Kulisic et al., 1995). In Pakistan, other species than *Argas persicus* included *Argas abdussalami* (Abdussalam and Sarwar, 1953); *Argas vespertillionis*, *Argas reflexus* and *Argas abdussalami* (Sheikh, 1968); *Argas vespertillionis*, *Argas reflexus reflexus* and *Argas abdussalami* (Iqbal et al., 1971); *Argas abdussalami* (Iqbal, 1971); *Argas reflexus* (Rasul et al., 1973) and *Argas reflexus* and *Argas abdussalami* (Shafique, 1979).

Parallel to the occurrence of Argasid ticks in avian species, the presence of Ixodid ticks has also been reported. However, in the present investigation, no species of the Ixodid ticks was identified.

*Argas persicus* burden was 3.25 per bird. The amount of blood sucked by a single tick from a poultry bird during 24 hr was 18.57 mg. Hence the total amount of blood sucked from one bird daily was 0.06 g. The present population of commercial layers in Pakistan is 64.36 million head (Anonymous, 1998-99). Thus the amount of blood sucked from the existing total population was calculated as 3,884.126 and 14,17,706 kg daily and annually respectively. The price index of blood as obtained from ten different poultry meat shops in different localities of Faisalabad was Rs. 1.50 per kg. The final estimated economic loss in terms of rupees was 2.13 million.

A negligible work has been conducted for the determination of economic losses due to tick infestation on poultry in Pakistan. During the present studies, the total blood sucked by a single tick daily was 18.57 mg. The studies in the past for the estimation of blood sucked by ticks showed that a single tick can suck 192.02 mg (Kosar, 1965), 98.56 mg (Khan, 1967) and 225.64 mg (Sheikh, 1968) during its different developmental stages. A similar trend was reported by Iqbal (1971) who reported that a single tick can suck 18.74 mg of blood daily. A loss of rupees 2.13 million annually was estimated due to blood sucked by *Argas persicus* during the present investigation. There is no report on the estimation of economic losses in terms of rupees in Pakistan as incurred due to tick infestation on poultry. Only one report of Iqbal (1971) on annual blood loss due to tick infestation on poultry showed that it was 3,51,815.2 kg. He did not calculate the economic losses in terms of rupees. Some studies in other countries reflected that tick

infestation is a serious problem resulting into a considerable economic loss. For instance, Frolov and Li (1982) reported that arthropods including *Cimex lectularius*, various species of *Mallophaga*, *Argas persicus* and *Dermanyssus gallinae* caused serious economic losses on poultry farms in USSR. A total loss of \$ 2.26 billion annually in livestock production due to ectoparasites was estimated by Byford et al. (1992). These ectoparasites included *Haematobia irritans*, *Amblyomma americanum*, *Musca autumnalis*, *Sarcoptes scabiei* and *Hypoderma* spp. Apart from the losses due to blood sucking, ticks are also a great threat to commercial poultry birds and are responsible for the transmission of certain pathogens like *Salmonella gallinarum*, *Aegyptianella pullorum*, *Mycoplasma gallicepticum*, *Mycoplasma neurolyticum* and *Borrelia anserina* (Stefanov et al., 1975; Soliman et al., 1988; Sa et al., 1995). The other threat to poultry birds from tick infestation is flaccid paralysis (Rosenstein, 1976; Mousa et al., 1988; Okaeme, 1989). The present estimation of economic losses reflects that ticks are important ectoparasites of poultry birds in Pakistan. Other aspects such as their vector role and releasing toxins in poultry resulting in paralysis of the birds should also be explored.

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