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Bovine fasciolosis: Prevalence, effects of treatment on productivity and cost benefit analysis in five districts of Punjab, Pakistan

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ABSTRACT

The present study reports the prevalence, effects of treatment and cost benefit analysis of bovine fasciolosis in five districts of Punjab Province viz Sargodha, Jhang, Muzaffargarh, Lodhran and Layyah. From each of the five districts, 80 animals were selected and fortnightly screened through standard coprological procedures for a period of one year for the presence of eggs of Fasciola species. Of 4800 faecal samples analyzed, 1222 (25.46%) were found positive for fasciolosis. The occurrence of *Fasciola* (*F.*) *gigantica* (22.40%) was higher ($P < 0.05$) than *F. hepatica* (3.06%). Highest month-wise prevalence ($P < 0.05$) of fasciolosis was found in winter (39.08%) followed in decreasing order by spring (29.50%), autumn (20.33%) and summer (12.92%). District-wise prevalence of fasciolosis was highest ($P < 0.05$) in Sargodha (40.31%) and lowest in Layyah (11.77%) while other districts were having intermediate values of prevalence of fasciolosis. Species-wise prevalence of fasciolosis was found higher ($P < 0.05$) in buffaloes (30.50%) as compared to cattle (20.42%). However, there were no age and sex-related differences ($P > 0.05$) in prevalence of fasciolosis. A strong positive association of grazing (OR = 1.81), mixed farming of small and large ruminants (OR = 1.39), stagnant pond bathing (OR = 2.24) and river/canal bathing (OR = 2.06) was found with the prevalence of fasciolosis as compared to stall feeding, separate farming of small and large ruminants and rivers/canal/ tap water bathing, respectively. Post-treatment average milk increase of 0.62 L per animal per day with 0.35% higher fat was observed in fasciolicide-treated animals with the cost benefit ratio of 3.9. The results provided significant data on the epidemiology of five districts of Punjab province which may be helpful for the planners and small holder dairy farmers for control of fasciolosis in the study districts.

1. Introduction

Parasitism is one of the major problems lowering livestock productivity round the globe (Vercruysse and Claerebout, 2001). The significance of helminth infections is increased manifold in developing nations like Pakistan where 65.2% population is rural (Population Census Organization, 2007) depending upon livestock for their earnings and where parasitism acts as a serious nuisance for livestock economy (Chaudhry et al., 1984). Among helminth infections, fasciolosis commonly called as liver fluke disease is of paramount importance due to its wider spectrum of definitive hosts (Rondelaud et al., 2001) causing acute and chronic infections (Sampaio-Silva et al., 1996). The disease is predominantly caused by *Fasciola (F.) hepatica* (Trematoda: Fascioliadae) and/or *F. gigantica* (Soulsby, 1987). The former has a cosmopolitan distribution while later is most widely distributed (30–90%) species in cattle of tropical regions (Soulsby, 1987; Torgerson and Claxton, 1999) like Pakistan (Shiekh, 1984), Bangladesh (Chowdhury et al., 1994), India (Ratnaparkhi et al., 1993), Iraq (A-Al-Bayati et al., 1991) and Turkey (El-Meterawy and Vurusaner, 1993). Acute fasciolosis can directly or indirectly cause huge economic losses (Chick et al., 1980; Spithill et al., 1997; Schweizer et al., 2005) in terms of anaemia due to its ability to suck 0.2–0.5 ml of blood per day per animal (Dawes and Hughes, 1970) and decrease in total proteins specifically hypoalbuminaemia (Soulsby, 1987) while chronic fasciolosis can reduce growth rate, feed conversion rate and wool production (Oakley et al., 1979). The worldwide losses in animal productivity due to fasciolosis were estimated as over US $ 3 billion per annum (Boray, 1985; FAO, 1994).

In Pakistan, surveillance record of fasciolosis showed an estimated prevalence of 14.71% in Punjab (Maqbool et al., 2002), 17.68% in Bahawalpur (Chaudhry and Niaz, 1984), 23.97% in Multan (Masud and Majid, 1984), 10.48% in Lahore (Sahar, 1996) and 55% in Peshawar (Siddiqi and Shah, 1984) which is mostly outdated and restricted to limited study areas in the vicinity of

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educational institutions (Iqbal et al., 2002). Hence, the present descriptive epidemiological study has been designed to (i) calculate the seasonal epidemiology of bovine fasciolosis in some districts of Punjab having different agro-climatic conditions and topography (ii) determine various associated risk factors including age, sex, species, climate and management influencing the prevalence of fasciolosis in small holder dairy farming systems in the study areas (if any) (iii) determine the effects of treatment on production using most efficacious fasciolicide and (iv) estimate cost-benefit ratio in terms of cost of treatment and loss of productivity of animals. The information given in the paper would be of value in planning an effective Fasciolosis Control Program at provincial and national level.

2. Materials and Methods

2.1. Study area

The study area included five districts of Punjab province viz; Sargodha (32°08′00″N latitudes & 72°67′00″E longitudes), Jhang (30°35′00″N & 71°39′00″E), Lodhran (29°55′00″N & 71°23′00″E), Layyah (31°24′00″N & 70°44′00″E), and Muzaffargarh (30°46′00″N & 70°30′00″E) lying within different agro-climatic conditions. District Sargodha lies 100–200 m above sea level bounded by Jhelum and Chenab rivers on the west and east, respectively. The soil contains alluvial deposits which are more than 300 m thick and extends down to several hundred meters

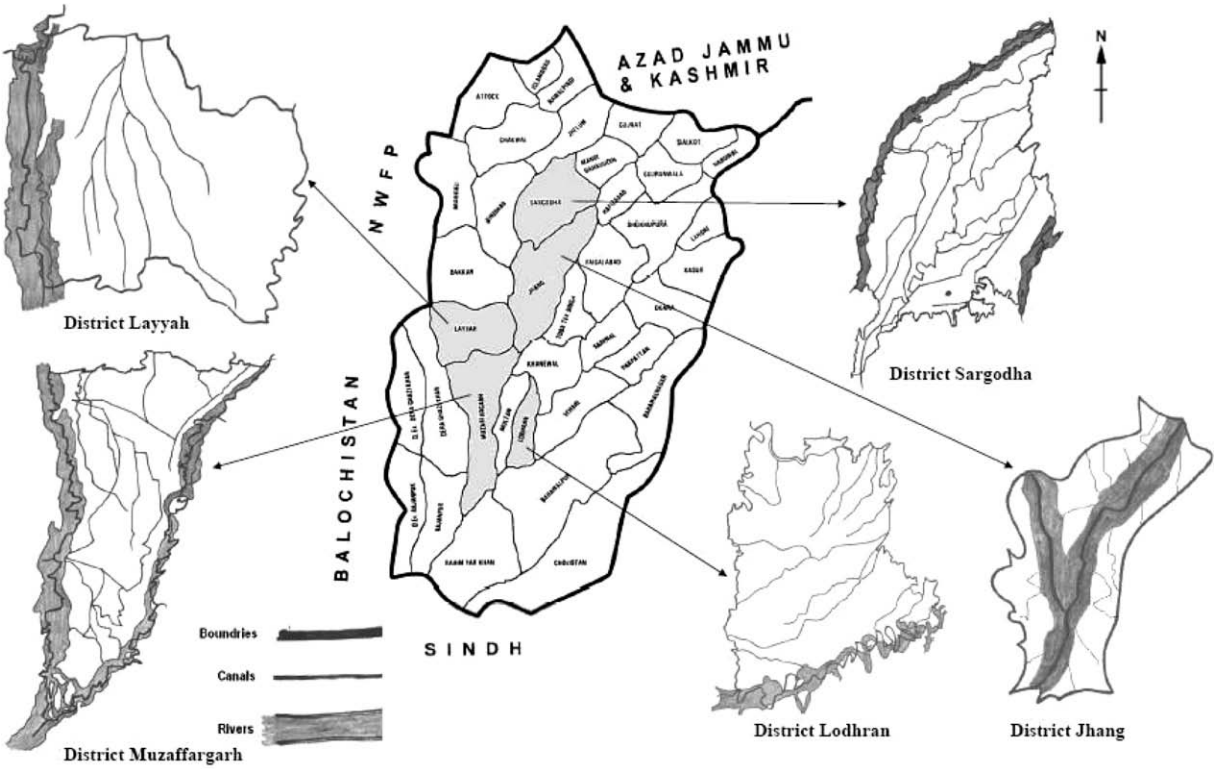

Fig. 1. Physical map of Punjab (Pakistan) showing boundaries of study area in relation to rivers and canals.

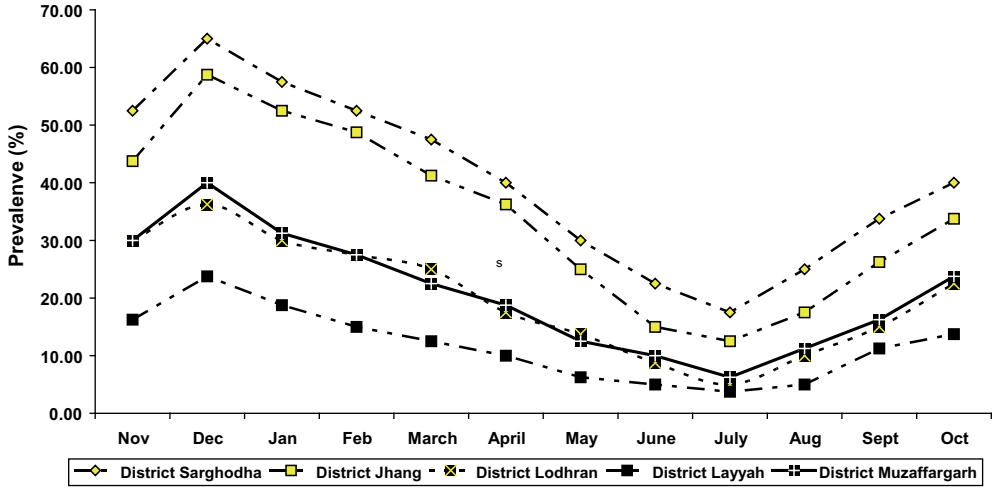

Fig. 2. Month-wise prevalence of fasciolosis in study districts of Punjab, Pakistan.