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INCIDENCE OF INTERNAL PARASITES OF SHEEP IN UPLAND DISTRICTS OF BALUCHISTAN

by

K.N.M. Khan, Atiq-ur-Rehman,
M. Munir, and B.R. Khan

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ABSTRACT

Sixty-eight flocks of sheep in Kalat, Pishin, Loralai and Zhob districts of upland Baluchistan were examined for the presence of internal parasites. Two of the most common breeds, Baluchi and Harnai, were included in the survey. Seventy-nine percent of the sheep in these areas were found to be infested with internal parasites. The incidence by districts was Kalat, 94%; Zhob, 80%; Loralai, 71%; and Pishin, 70%. The incidence of different parasites was Nematodirus spp., 54%; Fasciola hepatica, 26%; Marshallagia marshalli, 25%; Dictyocalous filaria, 21%; Strongyloides papillosus, 13%; Trichostrongylus spp., 13%; Avitellina centripulata, 13%; Moniezia benedeni 12.5%; Oesophagostomum spp., 12%; and Haemonchus contortus 11.75%.

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INTRODUCTION

The rangelands of upland Baluchistan are located in a diagonal band running southwest to northwest between 28° and 31° N and 66° and 70° E. Minimum temperatures are frequently below freezing during the period December through February. Average annual precipitation is 200-300 mm with from 60 to 80% occurring during the winter and early spring.

The livestock sector of Baluchistan contributes an estimated 25% of the gross agricultural product of the province. Sheep and goats are the major classes of livestock and make up 48% and 42%, respectively, of the livestock population of Baluchistan. Sheep and goat production contributes directly or indirectly to the incomes of about 80% of the population of the province (Nagy et al., 1987).

Rangelands are the major source of feed for livestock and less than 10% of the livestock receive supplementary feed, which usually consists of lucerne and barley grain (Nagy et al.,1987). Most of the farmers migrate from cooler regions to warmer areas of the province during winter in search of feed for their livestock (Ahmad, 1984).

Among various factors responsible for the economic losses in the sheep and goat industry of Baluchistan, parasitic diseases seem to be of potential importance (Khan et al., 1988). Although mortality rates due to parasitic diseases are very low, economic losses can be encountered in the form of reduced efficiency of feed utilization, loss of condition, retarded growth rate and subsequently loss of milk, meat and wool production. Such losses could take a heavy annual toll in profits, exceeding those due to bacterial diseases, but because losses from parasites are unspectacular and difficult to evaluate, they do not receive the attention they deserve.

The present study was designed to determine the different types of internal parasites prevalent in the sheep flocks of upland Baluchistan.

MATERIALS AND METHODS

The study was carried out in Kalat, Loralai, Pishin and Zhob districts of Baluchistan. A total of sixty-eight flocks were randomly selected from these areas viz; 20 each from Kalat and Loralai and 14 each from Pishin and Zhob. Five fecal samples were collected from each flock directly from the rectum (Table 1).

Table 1.

FIELD SITES AND NUMBER OF FLOCKS AND SAMPLES EXAMINED FOR THE INCIDENCE OF INTERNAL PARASITES

FIELD SITES	NO. OF FLOCKS EXAMINED	NO. OF SAMPLES	TOTAL POPULATION OF FLOCKS
KALAT	20	100	1748
LORALAI	20	100	2190
PISHIN	14	70	2070
ZHOB	14	70	1830
TOTAL	68	340	7838

PERIOD OF STUDY:- OCTOBER 1987 to MARCH 1988

The centrifugal flotation method (using zinc sulfate, 33%) as described by Solsby (1975) was used for the detection of parasite eggs in the feces. Sampling was done from October 1987 to March 1988. Incidence, or infestation rate, was calculated as follows:

$$\frac{\text{No. of samples}}{\text{No. of positive samples}} \times 100$$

RESULTS

RELATIVE RATE OF PARASITE INCIDENCE

Data from this study indicate that almost 80% of the sheep in these areas were infested with internal parasites. Of these, each sheep was parasitized with at least one species, and as many as six different types of ova were recorded from one animal.

Eighteen different types of internal parasites were present in these areas during this period. The relative rates of incidence of these parasites are given in Tables 2 and 3. Among nematodes, Nematodirus spp. were found to be most prevalent (54%) followed by Marshallagia marshalli (25%), Dictyocalous filaria (21%), Strongyloides papillosus (13%) Oesophagostomum spp. (12%) and Haemonchus contortus (11.75%). Among trematodes, Fasciola hepatica was found to be most prevalent with an incidence of 26% followed by Cotylophoron cotylophorum (2.5%) and Paramphistomum cervi (0.75%) and among cestodes, Avitellina centripulata (13%) followed by Moniezia benedeni (12.5%).

Table 2.

RELATIVE RATE OF INCIDENCE OF NEMATODES OF SHEEP UNDER THE ARID ENVIRONMENTAL CONDITIONS OF UPLAND BALUCHISTAN

NAME OF PARASITE	NUMBER OF SAMPLES POSITIVE	INCIDENCE %
NEMATODES		
Nematodirus sp.	218	54
Marshallagia marshalli	100	25
Dictyocalous filaria	84	21
Strongyloides papillosus	53	13
Trichostrongylus sp.	52	13
Oesophagostomum sp.	48	12
Haemonchus contortus	47	12
Trichuris globulosa	32	8
Chabertina ovina	27	7
Bunostomum trigonocephalum	25	6
Oestertagia ostertagi	15	4

Table 3.

RELATIVE RATE OF INCIDENCE OF TREMATODES AND CESTODES OF SHEEP UNDER THE ARID ENVIRONMENTAL CONDITIONS OF UPLAND BALUCHISTAN

NAME OF PARASITE	NUMBER OF SAMPLES POSITIVE	INCIDENCE %
TREMATODES		
Fascopla hepatica	105	26
Cotylophoron cotylophorum	10	3
Paramphistomum cervi	3	1
CESTODES		
Avitellina centripulata	52	13
Moniezia benedeni	50	13
Skrajabinema ovis	30	8
Moniezia expensa	6	2

Among all types of parasites, Nematodirus spp. were more prevalent than Fasciola hepatica, Marshallagia marshalli, Dictyocalous filaria, Strongyloides papillosus and Haemonchus contortus (Figure 1).

PARASITE INCIDENCE BY AREA

The incidence of internal parasites was highest in Kalat district, where 94% of the sheep were infested with internal parasites. Other levels of infestation were Zhob, 80%; Loralai, 71%; and Pishin, 70% (Figure 2).

Figure 3 shows the incidence, by area, of major parasites in upland Baluchistan. Again Nematodirus spp. were the major problem parasites in all these areas. Fasciola hepatica was most prevalent in Pishin and Kalat districts, Dictyocalous filaria and Strongyloides papillosus in Kalat and Loralai districts and Haemonchus contortus in Kalat and Pishind districts.

BREED VARIATION IN PARASITE INCIDENCE

There are four major breeds of sheep in Baluchistan viz; Baluchi, Harnai, Bebrik and Rafshangani. Baluchi sheep are mostly raised in the Kalat division and the Harnai breed in Loralai, Pishin and Zhob districts. Only these two breeds were included in this study. Incidence of almost all parasites reported was higher in Baluchi sheep as compared to Harnai sheep (Figure 4).

FIG. 1: RELATIVE RATE OF INCIDENCE OF DIFFERENT PARASITES OF SHEEP IN THE ARID UPLAND BALUCHISTAN.

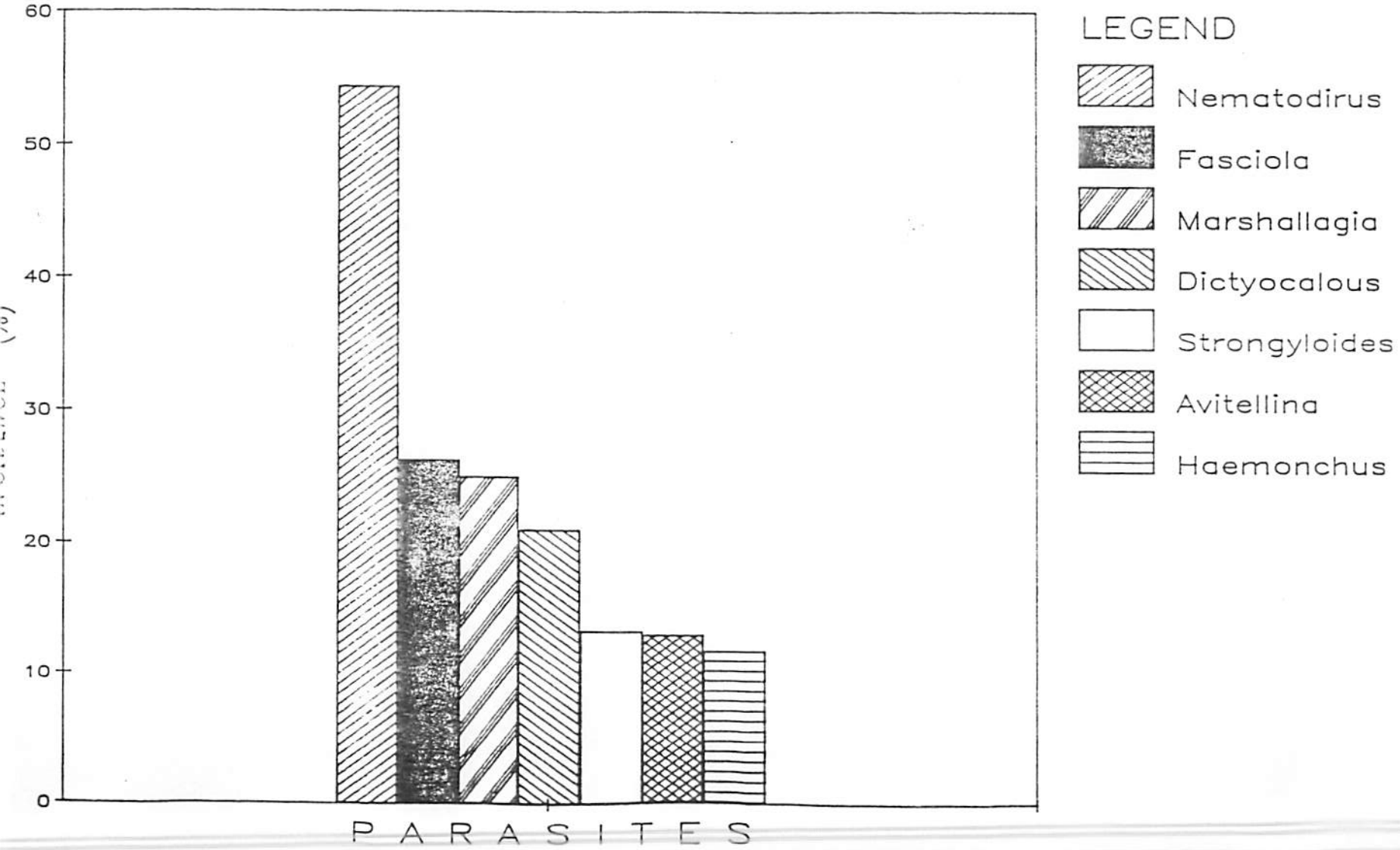

Figure 1

FIG. 2

INCIDENCE OF INTERNAL PARASITES OF SHEEP IN DIFFERENT AREAS OF UPLAND BALUCHISTAN.

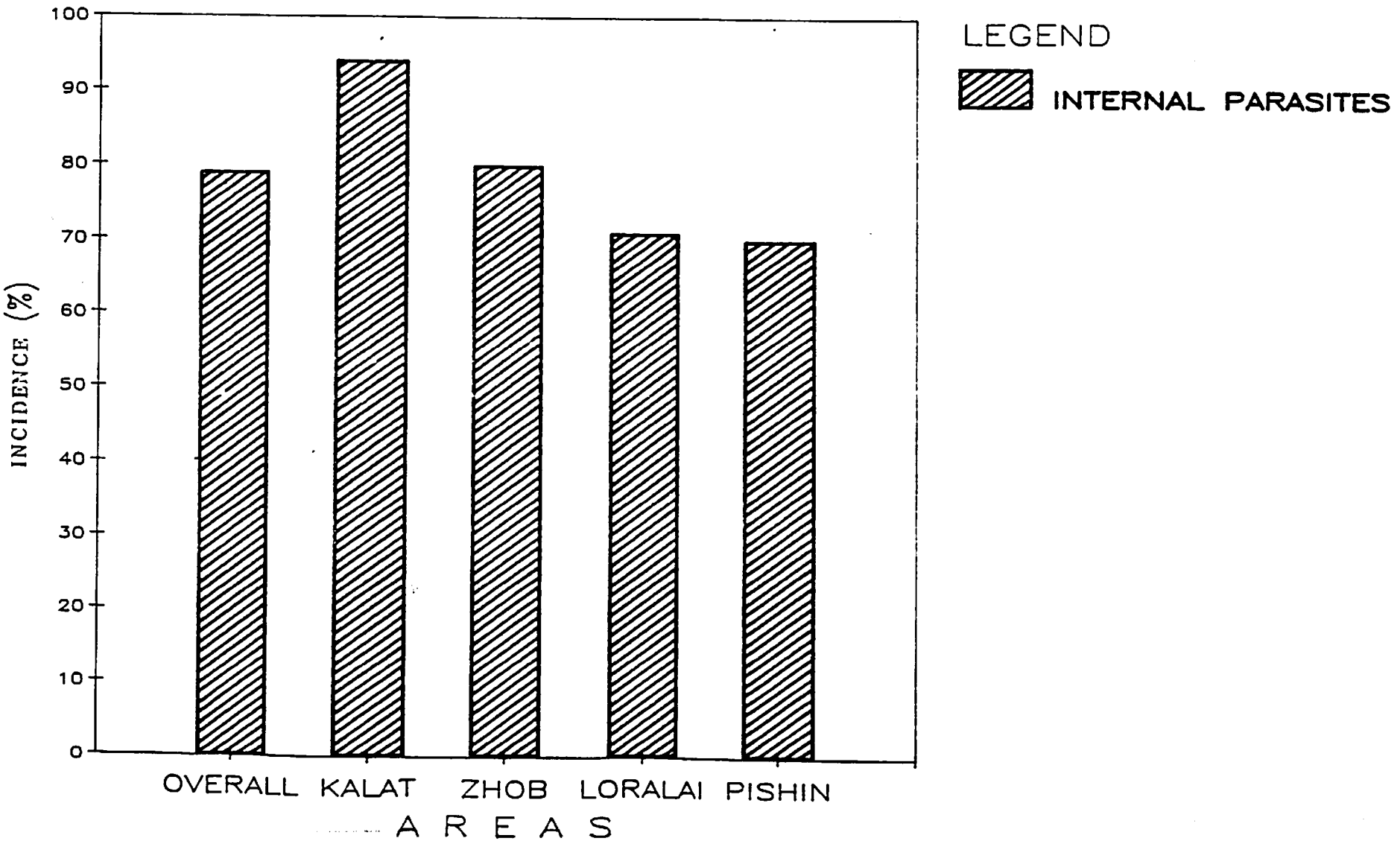

Figure 2

FIG. 3: INCIDENCE OF MAJOR PARASITES OF SHEEP IN DIFFERENT AREAS OF UPLAND BALUCHISTAN.

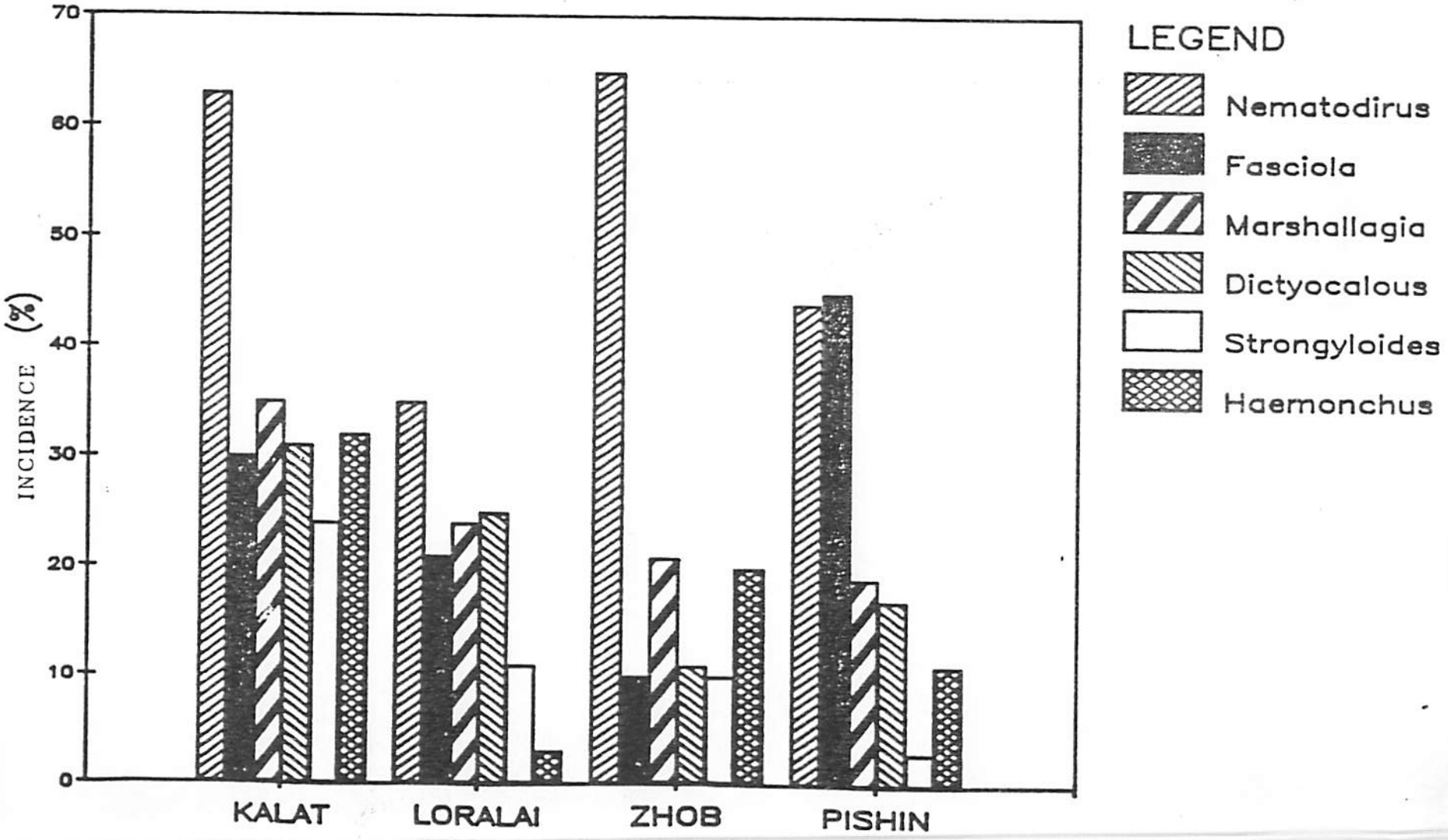

Figure 3

FIG. 4: BREED VARIATION IN THE INCIDENCE OF MAJOR PARASITES OF SHEEP IN UPLAND BALUCHISTAN

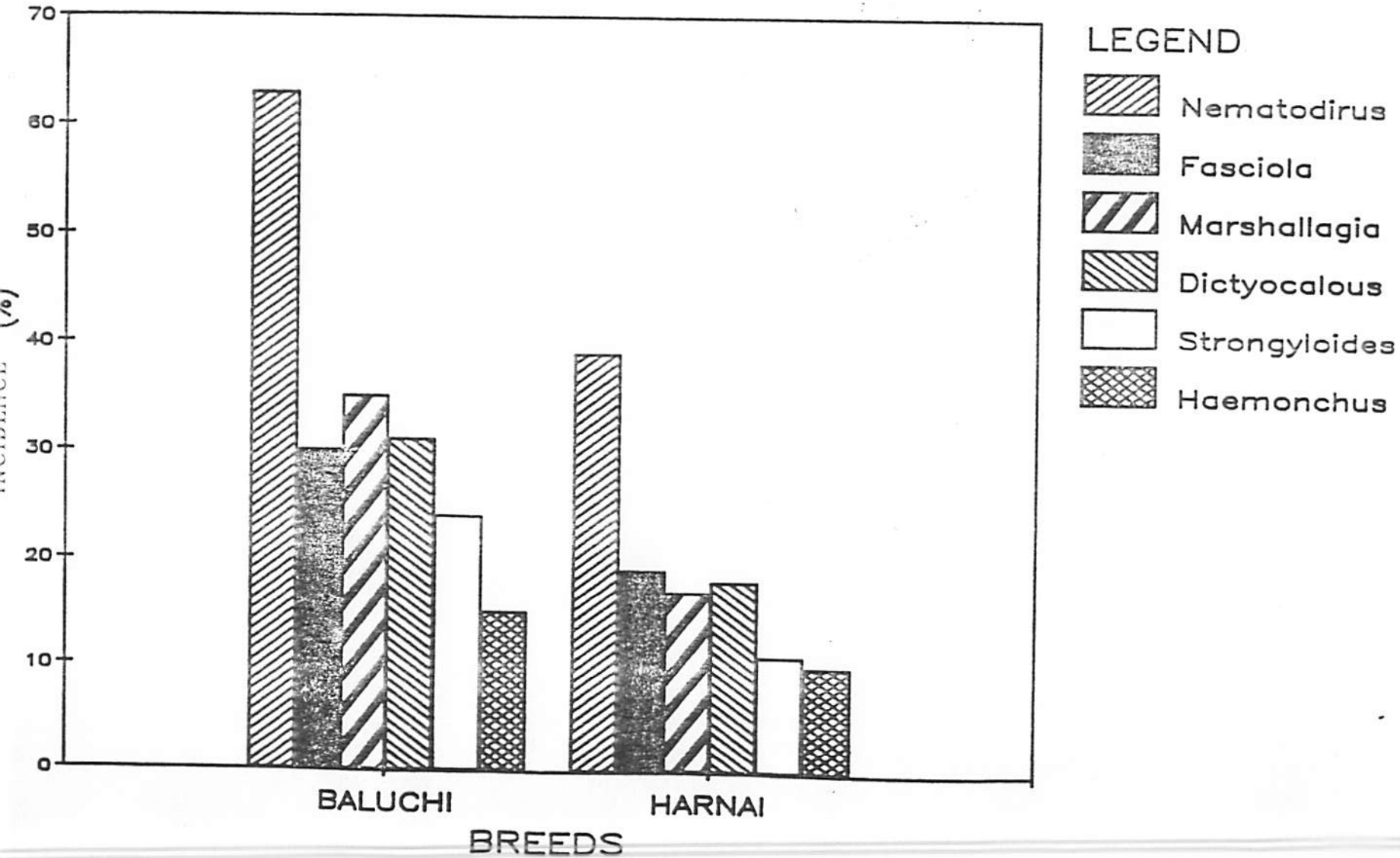

Figure 4

D I S C U S S I O N

Though sheep, like other farm animals, suffer from various infectious and non-infectious diseases, the most serious losses, especially in farm flocks, are due to internal parasites (Martin, 1983; Khan et al., 1988). The incidence of nematode parasites in an area is directly related to the ability of the pre-parasitic stages to withstand the environmental conditions (Gupta et al., 1987). The incidence of Nematodirus spp. and Marshallagia marshalli was relatively higher and the incidence of Dictyocalous filaria, Strongyloides papillosus, Oesophagostomum spp. Haemonchus contortus and Bunostomum trigonocephalum was relatively lower in the arid conditions of upland Baluchistan as compared to semi-humid, subtropical Punjab Province (Durrani et al., 1981; Ajmal, 1982).

The eggs and larvae of Nematodirus spp. are much more resistant to desiccation and these can even survive the coldest winter (Blood et al., 1983 and Coles et al., 1986), so this could be the reason for the higher incidence of Nematodirus spp. in the arid environmental conditions of upland Baluchistan. Gray and Kennedy (1981) and Khan et al., (1988) also reported the higher incidence of Nematodirus spp. in the arid environments of New South Wales (Australia) and Kovak Valley (Pakistan) respectively.

Marshallagia marshalli is a relatively less pathogenic parasite but heavy worm burdens could be a serious threat to the health of the animal. The prevalence of Marshallagia marshalli is comparable to the figures of Khan et al. (1988); it should be noted that this species was not recorded from many places of the Pakistan. The higher incidence of Marshallagia marshalli was also reported by Cabaret (1984) in the arid and semi-arid environments of Morroco.

The low incidence of Oesophagostomum spp. in these animals could be attributed to a very low resistance of the pre-parasitic stages of this nematode to the weather conditions (Kates, 1950 and Gupta et al., 1987). Similarly haemonchosis is reported to be uncommon in the arid and semi-arid regions. The predisposing causes include lush pastures and hot and humid climatic conditions (Blood et al., 1983 ; Vercruysse, 1985), which do not prevail in the arid uplands of Baluchistan. Kates (1950) also demonstrated that hot and humid weather provides favorable conditions for the development and survival of pre-parasitic stages of Haemonchus contortus.

The low incidence of Bunostomum trigonocephalum could be attributed to the susceptibility of the free-living stages of this parasite to winter and summer conditions (Shorb, 1940; Kates, 1947), resulting in their shorter survival on pastures under most of the climatic conditions here (Gupta et al., 1987).

In direct contrast to Shah et al., (1980) and Ajmal (1982) only 8% of the sheep in these areas were parasitized with Trichuris globulosa which is a common problem parasite in various regions of the Pakistan.

The low incidence of sheep trematodes in these areas as compared to the semi-humid Punjab Province (Majid and Hussain, 1980; Ajmal, 1982) could be attributed to the availability of the intermediate host, which is a snail. These snails prefer low-lying swampy areas with slowly moving water (Blood et al., 1983). The snail population in these arid lands could be very low, so the incidence of sheep trematodes is also lower as compared to the semi-humid conditions of the Punjab Province. Gupta et al., (1984) reported that the immature worms of Paramphistomum cervi which do not lay eggs, are present in the rumen from September to March and this period corresponds with our study period. This could be another factor for the lower incidence of this particular parasite.

The incidence of cestodes was similar to that found in the semi-humid conditions of Punjab Province except Moniezia expensa (Durrani et al., 1981; Ajmal 1982) and the arid conditions of Kovak Valley (Baluchistan) (Khan et al., 1988).

The higher incidence of internal parasites in the arid environment of upland Baluchistan could be attributed to malnutrition and poor pasture management. The overgrazed rangelands are in a state of degradation. They cannot fulfill the feed requirements of the livestock. It is a well-established principle that poorly fed animals are more prone to the effects of internal parasites and are more inclined to carry heavy worm burdens, because of their failure to throw off infestations quickly. Moreover, poor pasture management also plays an important role in the survival of parasite larvae (Blood et al., 1983).

Differences in the incidence of various parasites by area in the present study could be attributed to differences in the agroclimatic conditions of the four regions. Blood et al., (1983) mentioned that variations in infection intensity could be due to differences in the micro and macro climate of the environment and volume and height of the pastures. Lemma et al., (1985) also reported the role of altitude, soil type, salt content and local crowding of animals in watering sites in influencing the degree of incidence and intensity of infection of Fasciola hepatica.

Incidence of almost all parasites was higher in Baluchi sheep as compared to Harnai sheep. If the findings in Figure 4 are compared with those of Figure 1 and Figure 3, a strong correlation could be seen between Baluchi sheep and Kalat district in the incidence of these parasites, as Baluchi sheep are reared in the Kalat district. Ability to respond to certain helminth parasites is also genetically controlled (Blood et al., 1983) and this genetic variation could be the other factor.

A common feature of internal parasitism in sheep is a significant fall in the productivity of the flock. The economic losses to the farmers results from inefficient utilization of feed, slow growth rate, damaged wool, diminished wool and meat production, cost of medication, predisposition to other diseases and finally deaths of the parasite infested animals (Martin, 1983; Chaudhary et al., 1984).

Proper control and preventive measures are of utmost importance in these areas for healthy and profitable sheep raising. It has been shown experimentally that financial returns on funds invested in parasite control could be as high as 1200% (Morris et al., 1977).

RECOMMENDATIONS

1. Extensive studies on the seasonal distribution of parasitic diseases throughout the province should be undertaken and proper deworming and dipping schedule for each area should be designed.

2. Better livestock management and nutrition can play an important role in the prevention and control of parasitic diseases. Extension services therefore, could play an active role in introducing these practices through different media.

3. There is need for a network of well equipped disease- and parasite-diagnostic laboratories throughout the province.

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