Tropical Animal Health and Production, 37 (2005) 617–622
DOI: 10.1007/s11250-005-4291-2

The Prevalence of Bovine Hypodermosis in Kars Province, Turkey

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Kara, M., Arslan, M.O. and Gicik, Y., 2005. The prevalence of bovine hypodermosis in Kars Province, Turkey. *Tropical Animal Health and Production*, **37(8)**, 617–622

ABSTRACT

A total of 1276 cattle from 76 farms in 8 villages were examined by palpation of the skin for evidence of hypodermosis. The effects of age, sex, breed, and colour of cattle on hypodermosis were investigated. The overall prevalence was 31.9%. The mean number of warble fly larvae on infested animals was 8.46. Hypodermosis infestations were encountered in all the villages visited. Within a herd, the intensity of infestion decreased with the age of cattle. Infestation rates of warble fly larvae were lower in native cattle, in females, and in piebald animals.

Keywords: cattle, hypodermosis, Kars, Turkey

INTRODUCTION

Hypodermosis is a subcutaneous myiasis affecting mainly cattle but also other of mammalian species. Two species of cattle grubs affect domestic cattle in the Northern hemisphere: *Hypoderma bovis* and *H. lineatum*. Adults of cattle grubs are commonly known as heel flies, warble flies or gad flies. Both species have similar life cycles. Adult flies emerge during the spring and summer. They are large, hairy flies that resemble bees. After mating, the females locate cattle on which to lay their eggs. Egg laying occurs between late July and August in Kars province. Cattle often panic in the presence of the fast-moving flies and may run wildly with their tails high in the air in an effort to escape. In spite of this gadding response by cattle, the flies neither bite nor sting the animals. In fact, the adults do not feed at all and survive only 3–8 days.

Economic losses due to hypodermosis take several forms. First, gadding behaviour in response to adult fly activity decreases the animal's ability to graze efficiently. Gadding also makes cattle difficult to handle and increases the risk of self-inflicted injuries. Second, tunnelling through the animal's tissues by cattle grub larvae causes great damage. Heavy infestations can result in poor weight gain, delayed time to first lactation, and long-term production losses. Third, the breathing holes cut by the grubs damage the most valuable portion of the hide, substantially decreasing its value at slaughter.

In Kars province, no data were available regarding the extent of bovine hypodermosis and, consequently no national or regional control programme was being applied. The aim of this study was to determine the infestation rates of hypodermosis and the mean number

of warble larvae per cattle and also to investigate the effects of age, sex, breed and colour of cattle on hypodermosis.

MATERIALS AND METHODS

Kars province, one of the administrative provinces of Turkey, is located in the north-east of the country at an altitude of 1750 m. This province is the major cattle breeding area of the country. Eight out of 62 villages were chosen randomly as study areas. Those villages are at points north, south, east and west of the city of Kars. The villages were visited between 15 March and 15 April 2003 with staff of the Animal Health Department of Kars City. In these villages, 76 farms of volunteer farmers were visited. The numbers of farms visited in the villages was between 6 and 16 depending on the number of volunteers. Cattle in Kars graze in pasture from dawn to sunset for six months of the year, when they are vulnerable to warble flies. At each location, the backs of cattle were carefully palpated to detect the presence of warble larvae. Warbles were detected by rubbing the cow's backline and feeling for the cyst-like bumps. Meanwhile, the characteristics of the animals were noted on a questionnaire. Farmers would not allow the warbles to be expressed and, it was therefore not possible to obtain samples to identify the larvae. The number of infested animals according to the breed, sex, colour and age were compared using the chi-squared test.

RESULTS

Tables I and II summarize the results of the study. Hypodermosis was ubiquitous in all eight villages. Cattle from 9 out of the 76 farms were not infected with *Hypoderma* spp. The overall prevalence was 31.9%. The highest prevalence was observed in Melikkoy village (47%), while the lowest prevalence was found in Sogutlu village (13.9%). The general mean of larval counts was 8.46. Mean larval count per head was also higher in Melikkoy village (11.09), while the lowest was in Bogazkoy village (5.71). When the mean is considered by animal breed, native animals, known as North Eastern Anatolian cattle, had lower infections with hypoderma larvae, followed by purebred animals ($p < 0.001$). Mean larval counts were higher in male animals compared to females ($p < 0.01$). When the effects of colour were assessed, infestation was lower in piebald animals compared to those with light- or dark-coloured coats ($p < 0.001$). Infestation was higher in younger than in older animals ($p < 0.05$). The youngest animal infested with 6 larvae of *Hypoderma* spp. was an 8-month-old calf examined in Dikme village. The intensity of the parasitism per animal varied from 1 to 28 larvae. The highest warble larvae counts ($n = 28$) were found in a 2-year-old animal in Karakale village.

DISCUSSION

Both *Hypoderma bovis* and *H. lineatum* are found throughout Turkey, but there are few studies of these parasites. Kurtpinar (1947) first reported the presence of *H. bovis* in cattle in Turkey. *H. lineatum* was reported for the first time in cattle in Turkey by Merdivenci (1958).

TABLE I
The prevalence of hypodermosis and characteristics of animals in Kars province

Location	No. of cattle inspected and farms visited[a]	No. of infested cattle (percent)	Characteristics of infested animals										
			Breed			Sex		Colour			Age (years)		
			Native	Purebred	Crossbred	M	F	Light	Dark	Piebald	≤1	2	≥3
Hamzagerek	172 (16)	46 (26.7%)	4	2	40	14	32	21	6	19	25	12	9
Dikme	121 (10)	27 (22.3%)	–	13	14	3	24	6	13	8	10	12	5
Sogutlu	186 (8)	26 (13.9%)	–	–	26	16	10	5	21	–	13	10	3
Bogazkoy	90 (6)	24 (26%)	–	3	21	15	9	9	11	4	6	3	15
Melikkoy	124 (9)	47 (37.9%)	–	2	45	34	13	13	30	4	19	23	5
Karakale	161 (8)	76 (47%)	8	3	65	48	28	42	26	8	11	44	21
Hopali	243 (10)	71 (29.2%)	3	6	62	51	20	12	52	7	54	9	8
Camcavus	179 (9)	91 (50.8%)	–	21	70	63	28	18	66	7	53	26	12
Total	1276 (76 farms)	408 (31.9%)	15 (3.6%)	50 (12.3%)	343 (84.1%)	244 (59.8%)	164 (40.2%)	126 (30.9%)	225 (55.1%)	57 (14%)	191 (46.8%)	139 (34%)	78 (19.2%)

[a]Number of farms visited is shown in parantheses

TABLE II
Mean larval counts according to characteristics of the animals

Location	Total larval count	Mean larval count per head	Mean larval count for different characteristics of animals										
			Breed			Sex		Colours			Age		
			Native	Purebred	Crossbred	M	F	Light	Dark	Piebald	≤1	2	≥3
Hamzagerek	296	6.44	6.25	12.00	6.17	5.35	6.90	5.38	14.66	5.00	6.52	6.50	6.11
Dikme	213	7.89	–	7.69	8.07	12.33	7.33	8.16	7.07	9.00	3.40	11.33	8.60
Sogutlu	204	7.86	–	–	7.84	6.06	10.70	10.40	7.23	–	8.07	7.60	7.66
Bogazkoy	137	5.71	–	7.33	5.47	6.13	5.00	5.88	5.66	5.50	7.00	6.33	5.06
Melikkoy	521	11.09	–	10.00	11.13	12.64	7.00	13.38	10.03	11.50	15.84	8.95	2.80
Karakale	566	7.45	3.50	4.00	8.09	8.85	5.03	7.42	9.46	4.37	5.72	8.86	5.38
Hopali	767	10.81	12.6	8.50	10.93	13.17	4.75	12.58	10.61	9.14	11.42	13.00	4.12
Camcavus	748	8.22	–	8.90	8.05	9.39	5.57	8.40	8.22	7.57	8.92	8.30	4.91
Total:	3452		6.06	8.32	8.58	9.91	6.29	8.77	8.93	6.12	9.41	8.90	5.33
General mean:		8.46											

It was reported *H. bovis* is more prevalent than *H. lineatum* (Kalkan, 1963; Merdivenci, 1963). According to work carried out by Sayin and colleagues (2000), infestation rates of hypodermosis in cattle in Turkey was between 28.0% and 47.8%, and the mean number of warble larvae per head varied from 5.1 to 12.1 depending on the regions of Turkey.

The number of native and purebred animals examined in Kars, where artificial insemination has been practised for the last 20 year, was quite low, so that, crossbred animals were in the majority. In our observations, native animals appeared to be more resistant than purebred and crossbred animals. It was expected that there would be a higher prevalence in purebred animals, with higher larval counts than in the crossbreds, but purebred animals are kept and fed indoors, thereby avoiding warble flies. Male animals were more attractive to warble flies than were females. It is interesting to note that piebald animals were less attractive; in a mixed herd, warble flies had a tendency to select dark-coloured animals on which to lay their eggs. Young animals were more heavily infested with warble larvae than were mature milking cows, because older animals develop a degree of immunity to warble larvae. Calves born after the fly season and animals kept indoors during the summer had few larvae. Animals kept indoors acquired infection when watered outside the stable. In our observations, warble fly larvae appeared on animals in February. Larval counts peak in March and April, but even in June larvae are still present. Hence, in Kars province larval treatment must be completed by November.

Because of the lack of efficient application of systemic insecticides to cattle of Kars province, the prevalence of hypodermosis is high compared with European countries. In the absence of hypodermosis control, the intensity of parasitism per animal can vary from 50 to 150 warbles but quite often reaches 700 (Benakhla *et al*., 1999). This is the case in Mongolia (Orgil and Dambii, 2001), in Tibet (Yin *et al*., 2001) and in Morocco (Benakhla *et al*., 1998).

Our study shows that hypodermosis is a major parasitism of cattle in Kars. The economic effects of this disease on meat and milk production as well as on the leather industry and also on general cattle health require implementation of organized control programmes on a provincial or national level by the Turkish Animal Department.

ACKNOWLEDGEMENTS

I thank Mr Salih Celik, Director of the Animal Health Department of Kars, for his assistance with transport.

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(Accepted: 20 March 2005)