Prevalence of Bovine Demodecosis in Northern Nigeria and its Possible Economic Effect of Animal Production

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SUMMARY

The prevalence and importance of bovine dermatoses was studied by means of field surveys over a two year period.

Demodecosis, a parasitic disease caused by a mange mite, *Demodex folliculorum bovis*, is the second most common and important skin disease of cattle in Northern Nigeria. The disease is less common in well managed government-owned herds than in local herds. About 3% of the 10 million cattle population of Northern Nigeria are affected by this disease which is responsible for downgrading of hides and skins. It is conservatively estimated that the disease is responsible for an annual loss of about N300,000 to the hide and skin industries.

INTRODUCTION

BOVINE demodecosis a parasitic dermatitis is caused by *Demodex folliculorum bovis*, is regarded as the most important skin disease of cattle in East Africa (Bwangamoi 1968) Ghana (Oppong, 1971) and Canada (Smith, 1961a, b) where the importance of the disease in the hide and skin industries had been studied in detail. There is paucity of information on this disease in Nigeria where it is locally known as "Kirchi goma" due to the characteristic nodular formation. Prior to 1968 when we undertook a study of bovine dermatoses in Nigeria, almost every skin disease in cattle was described as "Kirchi" which was the local name for bovine cutaneous streptothricosis, a bacterial dermatitis caused by *Dermatophilus congolensis*. The apparent paucity of information on demodecosis, was probably due to the fact that this disease which is also locally

known as "Kirchi goma" has been confused with cutaneous streptothricosis for a long time. This vacuum in our knowledge stimulated the investigation to establish the incidence and relationship of all bovine dermatoses in Nigeria. An attempt was made to classify every skin lesion or disease encountered both clinically and histopathologically. This paper presents the prevalence of bovine demodecosis in relation to other bovine dermatoses in Nigeria with an attempt to highlight on its importance on animal production in the country.

MATERIALS AND METHODS

The breeds of cattle examined during the investigation were mainly indigenous, namely, White Fulanis, Sokoto Guadales and Wadaras although some exotic cattle of the Friesian and Brahma breeds were also seen in some government establishments. No attempt was made to establish any breed incidence.

Surveys were conducted twice yearly; towards the end of the dry season (Feb/March) and towards the end of the rainy season (Sept/Oct) in the Northern States of Nigeria, covering dairy, beef and cattle breeding establishments, belonging to State Governments and private individuals (Table I). Another survey was conducted in July/August, 1970 to coincide with the beginning and/or the peak of

the rainy season. Cattle in government establishments were fed a concentrate supplementary ration consisting of undetermined quantity of cotton seeds, ground maize and groundnut cakes in addition to grazing on the range. Water was allowed *ad libitum*. Cattle in private herds were only allowed to graze on the pasture without any concentrate supplementary ration. Government establishment herds were sprayed or dipped in insecticides every fortnight whereas privately owned herds were rarely dipped or sprayed. A thorough examination was made of all animals for evidence of any skin disease. When skin disease was present which could not be easily classified clinically, a skin biopsy sample was taken for histological examination. In addition, smears made from expressed nodular skin lesions were stained by Grams or Giemsa.

RESULTS

Table I illustrates the prevalence of demodecosis in Northern Nigeria as revealed by surveys carried out between September 1968 and August 1970. There was a wide variation in the prevalence of the disease from herd to herd ranging between 4.75 % and 0 %. The highest number of cases was always observed in a collection of privately owned herds. There was no observable difference in the extent and the severity of demodectic lesions between the dry and the wet seasons of the year. Demodecosis was the second most common skin disease in cattle next to bovine cutaneous streptothricosis in Nigeria. The other two common dermatoses were stephanofilariar dermatitis and papillomatosis.

TABLE 1
Prevalence of Bovine Demodecosis

Survey Centres	Oct./Nov. 1968		Feb. 1969		Oct./Nov. 1969		Feb./Mar. 1970		July/Aug. 1970	
	Total animal	No. affected	Total animal	No. affected	Total animal	No. affected	Total animal	No. affected	Total animal	No. affected
(B) Bornu Cattle Ranch*	500	4	425	12	360	20	572	15	562	30
(M) Pagolawa Dambata Kano State (P)	1806	13	1600	38	2060	90	1135	54	977	31
(D) Shika Experimental Station*	600	0	700	0	650	0	600	0	600	13
(B) LIBC, Kabomo*	153	0	140	0	169	3	139	0	159	0
(D) Vet. Field Station Mondo Rd. Kaduna*	80	0	95	0	89	0	76	1	—	—
(D) Fed. Dept. Vet. Res. Vom*	300	0	330	0	220	5	260	0	244	2
(M) Katsina (P)	—	—	284	1	205	1	189	2	224	4
(M) Dutsengera via Jos (P)	—	—	—	—	—	—	280	1	494	6
LIBC, Birm Kebbi Dogondaji, Bakura	—	—	—	—	—	—	553	2	410	13
(M) & Talata Mafara*	—	—	—	—	—	—	—	—	—	—
Total:	3439	17	3574	51	3753	119	3804	75	3570	104
Percentage		0.50		1.43		3.17		1.97		2.83

B = Beef Herd D = Dairy Herd M = Mixed Beef and Dairy Herds
— = Not visited * = State-owned herds P = Private Individuals.

As illustrated in Table 1 demodectosis occurred in about 0.5 % of all the cattle examined for skin diseases in Oct/Nov., 1968. A year later, this figure had increased to over 3 % and it had not shown any remarkable diminution in July, 1970 when the survey was completed.

The disease usually affected young animals about 6 months of age but also adult cattle. Both males and females were affected equally. Lesions usually occurred on the neck, shoulder and head but occasionally were seen covering the flank and other areas of the body. They appeared as small elevated nodules on the skin surface, each nodule measuring about 0.2 cm and 1.5 cm in diameter (Fig. 1). Apart from being erect at the sites of le-

sions the hair remained unaffected. When squeezed, the nodules ruptured to release a thick, creamy, purulent exudate which was occasionally blood stained. Smears made from the purulent exudates usually contained numerous *D. bovis* mites and an admixture of inflammatory cells consisting mainly of neutrophils, eosinophils and mononuclear cells. Occasionally the nodules ruptured on their own and the exudate released caused matting of the hair.

DISCUSSION

To the layman, skin diseases in cattle are not often associated with loss of productivity of the animal. However, if one

Fig. 1. Severe and generalized demodectosis in a Wadara bull with concentration of lesions on the neck.

takes a more critical view, it is not difficult to accept that this form of disease has a great drain on the economic values of livestock.

The effects of bovine demodecosis on the livestock production are mostly felt on the hide and skin industries. Skin in this country is used in three main ways:

- (1) consumption by the local populace as a delicacy (pomo and bokoto)
- (2) manufacture of local leather goods and
- (3) exportation, hence a source of foreign revenue.

The main effects of demodecosis in the skin are obvious scars and scabs due to the reaction around the parasitic cysts. Because of the type of lesion and the general caseous appearance of the nodules, demodecosis-affected skin cannot be sold for human consumption. When tanned, the grain surface of the leather also shows obvious scars and depressions which either leave pin-hole damage (Smith 1961b) or voids when the leather is split (Tancous, Roddy and O'Flaherty, 1959). The damage done to the hides and leather results in a marked downgrading of leather which becomes unsuitable for export. It is only in the manufacture of some locally made leather goods that this kind of skin can find a use, and even so, the skin is considerably downgraded.

It is conjectural to consider whether the observed increase in the prevalence of demodecosis since the study began is relative or absolute. If the increase has been due to an enhanced accuracy of diagnosis since the study started, then this would be a relative increase. On the other hand, it would appear that the disease is actually becoming more prevalent

There are no available figures to show the extent of economic loss to the hide and skin industry. However, certain

deductions can be made from the presented data in comparison with the less damaging effect of bovine streptothricosis. For the purpose of our discussion, let us simplify the matter by taking another look at the table (Table I) which presents the prevalence of bovine demodecosis over a two year survey period. Taking the Oct/Nov. 1969 and July/Aug. 1970 figures, it will be observed that about 3 % of all the animals examined had demodectic mange. It will be appreciated that this is a conservative estimate when it is recognised that most of the cases seen were in the local Fulani herds. Only a few cases were seen in the Government-owned herds except Bornu Cattle Ranch which purchased animals from local herds for fattening and breeding purposes. If it is accepted that the population figure for heads of cattle in Nigeria is about 10 million (FAO, 1966), 40 % of which are slaughtered, it is immediately apparent that about 120,000 skins are affected annually. In terms of money lost due to downgrading of hides, this is put at a conservative figure of about ₦300,000.00 assuming that an average of two naira and fifty kobo (₦2.50) is lost per infected skin. Of course this does not take into account losses due to deaths or reduction in weight gain and/or productivity brought about by heavy infestation of the bovine skin.

In a heavily parasitised skin, the thermoregulatory effect of the sweat glands is greatly reduced due to infestation and attendant reaction of the sweat glands. In the normally hot environment of our cattle recently exacerbated by drought, affected animals are unable to lose heat normally through the sweating mechanism. This in effect may lead to death due to heat stroke.

It has been shown earlier during this discussion that demodecosis is more prevalent in local than in government-owned

herds. There are probably two major factors responsible for this state of affairs. Firstly cattle in government-owned herds are sprayed with or dipped in insecticides regularly and secondly, they are better fed, grazing being supplemented by well balanced concentrate rations. In effect better management of government herds reduces losses due to bovine demodicosis. This observation is most encouraging, as, if this level of management is extended to private herds through education of farmers and herdsmen, it will undoubtedly reduce losses incurred from skin infestation.

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