BOVINE ENZOOTIC HEMATURIA IN MADEIRA ISLAND PORTUGAL

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Abstract

A study was performed in Madeira Island during a 15-month period in which whole carcasses were rejected by local abattoirs due to tumoral lesions of the urinary bladder. Considering the reviewed information, the tumoral lesions observed were related to ingestion of the fern *Pteridium aquilinum* which is widely distributed throughout the archipelagos of Madeira and Azores. From a total of 7463 livestock, 25 carcasses (0,33%) were rejected due to malignant lesions with predominance of hemangiosarcoma followed by transitional cell carcinoma and adenocarcinoma.

Introduction

Madeira Island is situated in the North Atlantic Ocean and covers an area of 736 km^2. The climate is subtropical with mild winters (16º C) and in summer the average temperature is 21º C with an annual rainfall of 400-1000 ml in the south coast and 1000-2000 ml in the north coast (Baez et al., 1983).

The typical stock owner dedicates most of his time raising one or two cows in order to produce milk, meat and manure. Cattle are sheltered in typical stables of 9 to 10 m^2, and 2 m high, with neither windows nor any drainage system for urine and faeces. For bedding, stock owners use ferns, mainly *Pteridium aquilinum,* which is widely distributed throughout the island. Due to the relief of the island, there is no land for the production of forage crops. The animals' diet is based on wild plants and herbs that stock owners gather to offer their animals. Among the gathered plants we often find *Pteridium aquilinum* that ends up being ingested by cattle (Gouveia, 1998).

At the beginning of Summer, when fields are covered with *Pteridium aquilinum* in the highlands of Paúl da Serra, (figure 1) stock owners usually gather large amounts of the fern for bedding needs for the whole year (Gouveia, 1998).

The cattle population of Madeira is only about 4,500 animals (1,500 dairy animals and 3,000 other stock) for a population of 260,000 inhabitants, so there is a need to import cattle mainly from Azores due to its geographic proximity (Table 1).

In Madeira, data concerning Bovine Enzootic Haematuria (BEH) go back to the fifties (Bacili, 1963). BEH was then already well known by stock owners, who feared this condition due to losses expressed in meat, milk and calving. Between 1962 and 1992 there were no data registered.

Due to the abandonment of the agricultural lands in the last decade, fields were invaded by infesting plants and herbs, among which figures *Pteridium aquilinum* and consequently, the registration of clinical cases of BEH increased.

According to Funchal abattoir records and the 1997 Annual Report of Direcção Regional de Pecuária (Direcção Regional Pecuária, 1997), the total number of rejected carcasses due to BEH, between 1993 and 1997, were four.

Material and Methods

The collection of bovine urinary bladders was performed in all abattoirs during a fifteen month period (January 1998 to March 1999). After observation, all samples showing suspected tumoural lesions were sent to the laboratory and processed using routine techniques of fixation in 10% formalin, paraffin tissue embedding, followed by staining with haemotoxylin-eosin (Ambrogi, 1960). Samples were accompanied by information concerning: age, sex, breed, ear tag number and origin (Tables 1-5 display this data).

Table 1.
Total number of cattle slaughtered
Origin: Madeira/ Azores/ Others

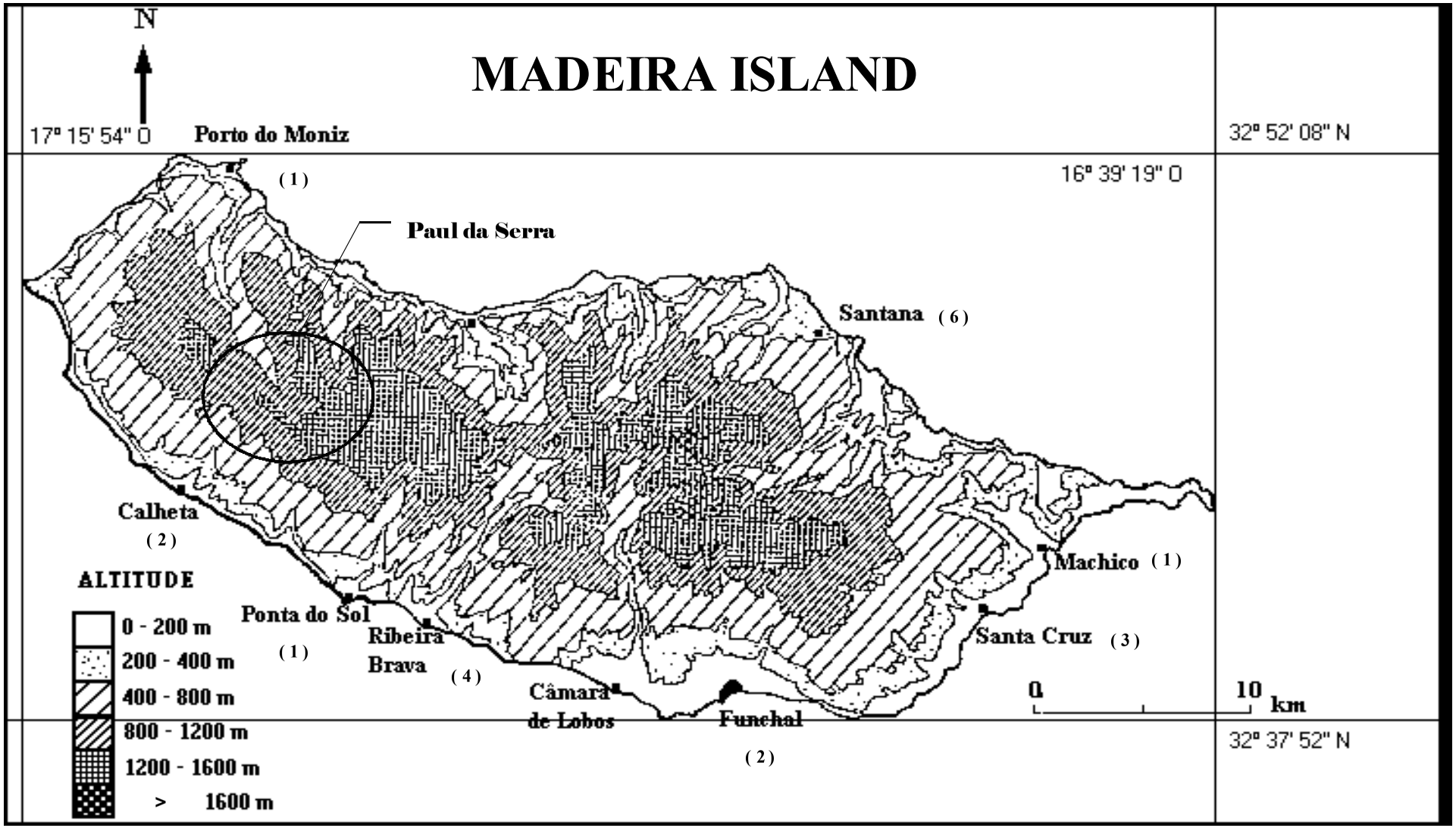
Total number of cattle slaughtered	Origin		
	Madeira	Azores	Others
7463	1715	5722	26

Daily data reports from Funchal abattoir (Jan 1998 – Mar 1999)

Table 2.
Total number of cases of B.E.H. in cattle from Madeira / Azores

Origin	Benign Lesions	Malignant Lesions	Total
Madeira	7 (13.46%)	13 (25.00%)	20 (38.46%)
Azores	20 (38.46%)	12 (23.08%)	32 (61.54%)
Total	**27 (51.92%)**	**25 (48.08%)**	**52**

Figure I



The numbers in brackets refer to the total of cases of BEH in the different regions of Madeira

Table 3.
Animal distribution accordingly to age group

Age Group (yrs)	Number of animals
2 - 3	7
> 3 - 5	26
>5 - 7	4
>7 - 9	8
> 9	7
Total	**52**

Table 3.
Animal distribution accordingly to age group
(yrs)

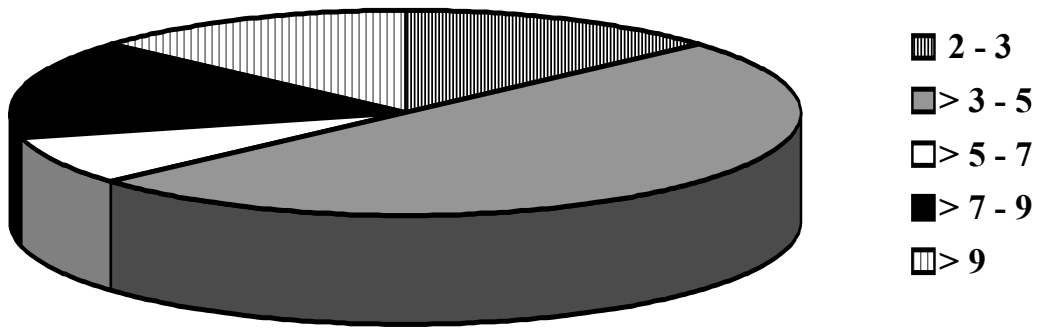


Table 4.
Histological Classification of tumoural lesions observed

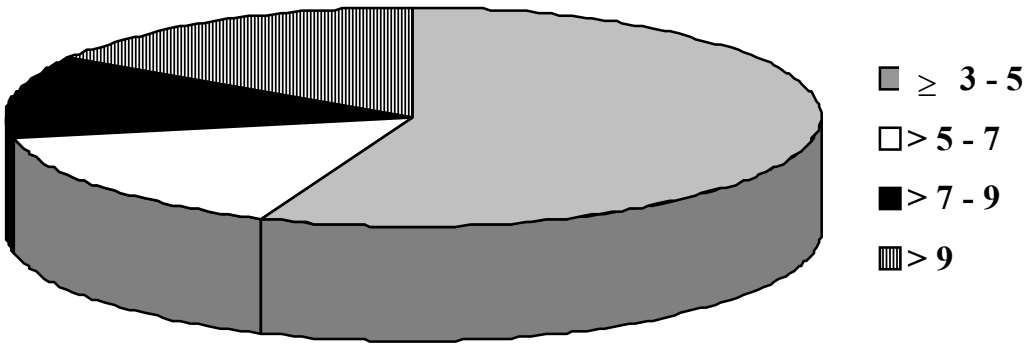
Histological Classification of the tumoural lesions	Number of animals (%)
Papilloma	11 (21.15%)
Haemangioma	16 (30.77%)
Transitional cell carcinoma	7 (13.46%)
Haemangiosarcoma	6 (11.54%)
Transitional cell carcinoma and Haemangioma	5 (9.62%)
Transitional cell carcinoma and Haemangiosarcoma	3 (5.77%)
Transitional cell carcinoma and Papilloma	1 (1.92%)
Adenocarcinoma	1 (1.92%)
Adenocarcinoma and Papilloma	1 (1.92%)
Transitional cell carcinoma, Papilloma and Haemangioma	1 (1.92%)
TOTAL	**52**

Table 5.
Occurrence of malignant lesions and age group

Age group (yrs)	Number of cases		Total
	Madeira	Azores	
≥ 3 - 5	6	8	**14**
> 5 - 7	3	1	**4**
> 7 - 9	0	3	**3**
> 9	4	0	**4**
Total	**13**	**12**	**25**

Table 5.

Occurrence of malignant lesions and age group



Conclusion

Facing the annual increase of BEH and because very little was known about the incidence of the disease in the Island, the veterinary authorities determined that from January 1998 onwards, the urinary bladders of cattle slaughtered in all abattoirs of the Island should be inspected on a routine basis. As result a higher incidence of cases is now being reported.

As far as histological classification of tumours (WHO, 1974) is concerned, there was a incidence of 27 cases (51,92%) of benign nature (both papilloma and haemangioma) and 25 cases (48,07%) of malignant nature (transitional cell carcinoma, haemangiosarcoma and adenocarcinoma, either in a pure form – 26,92% or associated - 21,15%) (Table 4).

In our study we registered a total sum of 52 cases and a higher incidence of the disease (6 cases) in the municipal area of Santana, in the northern part of the Island (Fig. 1). This finding corroborates the fact registered in previous studies (Bacili, 1963) that suggest this area as endemic to BEH. In terms of percentage (%), there was a greater predominance of malignant lesions in the animals from Madeira, while those from Azores showed more lesions of benign character (Table 2). This fact might be due to the four oldest animals from Madeira being 10 to 12 years old, while the oldest animal from Azores was 9 years of age (Table 5).

We verified that the group of animals aged between 3 and 5 years (26 cases) were more affected due to epidemiological characteristics of the disease, namely age and continuous ingestion of bracken fern. The youngest animal was 24 months years old and the oldest 12 years old. Concerning the animal sex, and considering that most of the slaughtered cattle was of dairy origin, all cases except one occurred in females.

References

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