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THE DISTRIBUTION AND HOSTS OF *RHIPICEPHALUS GLABROSCUTATUM*

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ABSTRACT

MACIVOR, K. M., 1985. The distribution and hosts of *Rhipicephalus glabroscutatum*. *Onderstepoort Journal of Veterinary Research*, 52, 43–46 (1985).

Three domestic and 12 wild species of ungulate have been recorded as hosts of *Rhipicephalus glabroscutatum*. The major site of attachment for larvae, nymphs and adults is around the hooves and on the lower legs. This tick is virtually confined to the eastern Cape Province, Republic of South Africa. Classed as an obligative xerophile it inhabits non-coastal areas of low rainfall characterized by Karoo and Karoid vegetation.

INTRODUCTION

Theiler (1962) observed that the smooth brown tick, *Rhipicephalus glabroscutatum*, occupies localized areas of the eastern Cape Province, Republic of South Africa, and is "essentially a parasite of smaller stock". She noted that attachment on the feet of sheep and goats could lead to lameness. Its 2-host status was established by Du Toit (1941) and confirmed by Rechav & Knight (1981).

Baker (cited by Hoogstraal, 1978) stated that "*Rhipicephalus glabroscutatum* has changed in recent years from a 'rare tick species' to a common pest of South African domestic animals." In contrast, however, Rechav & Knight (1981) suggested that *R. glabroscutatum* has "failed to modify its feeding to domestic animals".

Because of these conflicting opinions, a review of host and distribution records was considered necessary in order to investigate the possible exploitation of stock by this tick species.

METHODS

Locality and host records were obtained from the literature, from personal communications and from my own research. Co-ordinates and approximate altitudes for localities were determined from 1:250 000 topographical maps. If a locality was situated between contours or if it covered a relatively large area (e.g. Mountain Zebra National Park), altitude was expressed as a range. Similarly, rainfall was estimated from isohyets on 1:250 000 rainfall maps based on rainfall figures from 1921–1960 inclusive. The approximate annual rainfall estimated in this manner was compared with that of more recent records obtained for the Cape Midlands and Karoo area (Badenhorst, 1970). The vegetation of the various localities was deduced from a vegetational map of southern Africa (Acocks, 1975). All possible vegetational types and constituent vegetational categories were listed.

HOST RELATIONSHIPS

With the exception of the Cape mountain zebra, all the hosts of *R. glabroscutatum* recorded to date are bovids (Table 1). This tick has been collected from Shorthorn and Bonsmara cattle, Merino sheep, Angora and Boer goats and from 12 species of wild ungulates. Although small numbers of ticks have been found on the bodies of buffalo and Shorthorn cattle, the primary site of attachment is the legs and feet of small stock and small to large wild animals. The number of ticks recorded was generally low. Exceptions to this trend were adults on goats (K. MacIvor, unpublished data, 1983), adults on gemsbok and eland, and immatures on kudu and eland (Horak, Potgieter, Walker, De Vos & Boomker, 1983).

Since the number of ticks recovered from an animal depends on the efficiency of the search, an accurate assessment of actual numbers occurring on hosts will only be possible once a uniform method of sampling has been adopted. The efficiency of the destructive sampling method of Horak, Meltzer & De Vos (1982) is evidenced by the large number of immatures obtained from kudu (Table 1). These results led Horak *et al.* (1983) to refute the suggestion by Knight & Rechav (1978) that the immature life stages feed on hosts other than kudu. In addition, the fact that 15 ungulate species have been recorded as hosts (Table 1) contradicts the claim by Rechav & Knight (1981) that *R. glabroscutatum* has a narrow host range. However, rather than being labelled a "common pest of South African domestic animals" (Baker, cited by Hoogstraal, 1978), *R. glabroscutatum* should at present be considered as a parasite of smaller stock, amongst which goats appear to be the most important as hosts.

Tick burdens recorded in the future by more extensive destructive sampling should indicate which wild species are the preferred hosts and hence have the greatest potential for the contamination of small stock habitats.

ZOOGEOGRAPHY

The majority of records (23 out of 27, or 85 %) relate to the south-eastern Cape Province in the zone 31°30′–33°45′S and 24°21′–26°43′E (Fig. 1). The remaining records are from the central and southern Cape Province in zone 32°21′–33°54′S and 20°40′–22°35′E. There are not records of *R. glabroscutatum* from coastal areas.

These locality records confirm statements by Theiler (1962) and Rechav & Knight (1981) that *R. glabroscutatum* occurs in localized areas of the eastern Cape Province. These areas to a large extent overlap the regions in which much of South Africa's mohair is produced. In 10 localities or districts in which *R. glabroscutatum* has been recorded 49,8 % of South African mohair was produced during 1979 and 1980 (Table 2; Van der Westhuysen, Wentzel & Grobler, 1981). If the infestation of Angora goats by *R. glabroscutatum* in these areas is at a high level, the economic implications of parasitism by this tick species are considerable.

The locality, altitude, mean annual rainfall and vegetation of the sites at which *R. glabroscutatum* has been collected are listed in Table 3. It is present at a median altitude of 700 m, in a range from 100 m at Uitenhage to 1957 m in the Mountain Zebra National Park. The median mean annual rainfall of localities, as calculated from isohyets, is 300–400 mm, with a range extending from 200 m at Beaufort West and Oudtshoorn to 600 mm at Somerset East and Table Farm (Table 3). This approximation proved to be valid when compared with a more recent geographical survey of the Cape Midlands and Karoo, in which it was calculated that the central parts of this region have an annual rainfall of 340 mm, with the highest recorded mean rainfall of 500–625 mm in the Bamboes and Suurberg mountains (Badenhorst, 1970).

Karoo plus Karoid Bushveld (66 %) and False Karoo (28 %) comprise 94 % of the vegetational types in which *R. glabroscutatum* was found (Table 4). Valley Bushveld, Karoid Broken Veld and False Upper Karoo are considered to be the predominant vegetational categories in these localities.

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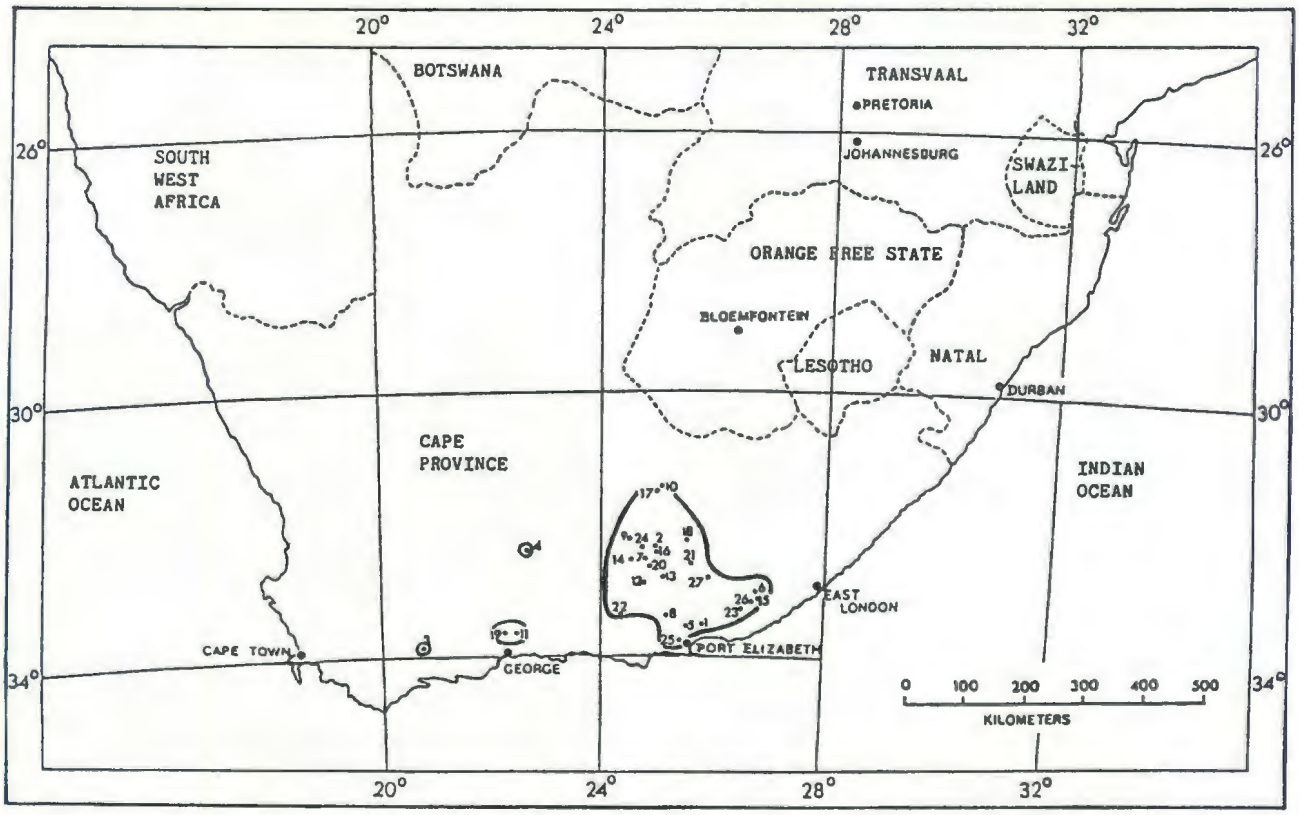

FIG. 1 The distribution of *Rhipicephalus glabroscutatum*, the smooth brown tick, in the Republic of South Africa

TABLE 1 Host records for *Rhipicephalus glabroscutatum* in the Republic of South Africa

Hosts	No. of collections	No. in which tick stages are specified	Total				Maximum single infestation			
			♀	♂	N	L	♀	♂	N	L
(a) Domestic animals:										
Goats*	497	489	2 610	2 270	673	141	70	38	46	8
Sheep	5	2	20	4	0	0	17	3	0	0
Cattle	2	1	5	6	0	0	5	6	0	0
(b) Wild animals:										
Steenbok *(Raphicerus campestris)*	1	0	P	P	0	0	P	P	0	0
Grey duiker *(Sylvicapra grimmia)*	1	1	2	0	0	0	1	0	0	0
Mountain reedbuck *(Redunca fulvorufula)*	1	1	3	2	0	0	3	2	0	0
Blesbok** *(Damaliscus dorcas phillipsi)*	2	2	6	22	0	0	4	14	0	0
Vaal ribbok *(Pelea capreolus)*	1	1	0	1	P	12	0	1	P	12
Springbok *(Antidorcas marsupialis)*	1	0	P	P	0	0	P	P	0	0
Gemsbok** *(Oryx gazella gazella)*	4	4	96	219	8	0	51	103	2	0
Red hartebeest *(Alcelaphus buselaphus caama)*	2	2	8	12	1	0	8	12	1	0
Kudu**	5	5	20	11	3 718	8 987	6	1	1 296	5 846
Kudu *(Tragelaphus strepsiceros)*	5	4	152	175	4	0	33	34	4	0
Eland** *(Taurotragus oryx)*	1	1	164	198	156	880	164	198	156	880
Mountain zebra *(Equus zebra zebra)*	1	1	3	3	0	0	1	1	0	0
Buffalo *(Syncerus caffer)*	2	1	0	1	P	0	0	1	P	0

KEY:

* = type series for male and female *R. glabroscutatum* (Theiler, 1962)
** = sampling by the destructive technique of Horak *et al.* (1982)
P = *R. glabroscutatum* present, number(s) unrecorded

TABLE 2 Mohair production (1979 to 1980) in 10 localities in which *Rhipicephalus glabroscutatum* has been recorded (expressed as a percentage of the total production)

Name of locality	Percentage of total mohair production*
Jansenville	10,9
Somerset East	9,6
Uitenhage	6,2
Cradock (Mountain Zebra Park)	6,1
Graaff-Reinet	5,9
Steytlerville	5,1
Pearston	3,0
Beaufort West	1,6
Oudtshoorn	0,7
Middelburg	0,7
Total percentage	49,8

* From Van der Westhuysen *et al.* (1981)

It is difficult to make generalizations concerning the climate in the area of distribution of *R. glabroscutatum* because of differences between the constituent regions, the midlands (Cradock*, Grootfontein & Middelburg), the Karoo (Ashbourne, Fairview, Graaff-Reinet*, Jansenville*, Jouberts Kraal, Kendrew, Libertas, Pearston* & Tandjiesberg) and the coastal plateau (Addo, Brakhill, Bucklands, Glenconnor, Kudu Reserve, Somerset East*, Table Farm, Uitenhage*, Ulster Farm & Waldeck Farm).

In the midlands, 70–80 % of the total rainfall is from thunderstorms (Badenhorst, 1970, citing Els, 1965), when high temperatures are experienced between January and March (end of summer–middle of autumn). In the Karoo region, the contribution by thunderstorms falls to 25–30 % (Badenhorst, 1970, citing Els, 1965) and relief type rainfall experienced mainly in summer (November–January) is caused by cool tropical breezes from the south and south-east (Badenhorst, 1970). On the coastal plateau, rainfall is cyclonic from the west during the winter (May–July).

Inland maximum temperatures are stable, while minimum temperatures are variable due to the varying influence of subantarctic air. Correspondingly, minimum temperatures are stable on the coastal plateau, while maximum temperatures vary due to berg winds (Badenhorst, 1970). There is a general trend towards an increased range in temperatures from the coast to the inland areas, although the maximum temperatures at midlands stations is lower than might be expected because of their higher altitude (Table 5).

R. glabroscutatum therefore occupies regions with low rainfall which are characterized by varying seasonal rainfall and a wide range of temperatures. Consequently it appears to be a tick that is tolerant of adverse, dry conditions.

Pegram, Hoostraal & Wassef (1981) divide the genus *Rhipicephalus* into 3 ecological groups, namely, obligative hygrophiles, obligative xerophiles and facultative species. *Rhipicephalus pulchellus*, a species not found in South Africa but which in eastern Ethiopia is restricted to "semi-arid plains and bushland below 2 000 m receiving 100–800 mm rain", is classed as an obligative xerophile (Pegram *et al.*, 1981). In South Africa, *R. glabroscutatum* appears to be restricted to habitats similar to those occupied by *R. pulchellus* in eastern Ethiopia, with respect to altitude, low annual rainfall and vegetation. On this basis *R. glabroscutatum* may also be classed as an obligative xerophile.

TABLE 3 Locality records for *Rhipicephalus glabroscutatum* in the Republic of South Africa

No. of locality	Name of locality	Co-ordinates	Altitude (m)	Annual rainfall (mm)	Vegetational type[a]	Vegetational category[a]
1	Addo	33°29′S, 25°45′E	200	400	IV	VB
2	Ashbourne	32°24′S, 25°05′E	900	400–500	IV, IV A	FU, CL, KB, FK
3	Barrydale	33°54′S, 20°44′E	400	300	IV	KB
4	Beaufort West	32°21′S, 22°35′E	850	200	IV	KB, CL
5	Brakhill	33°33′S, 25°25′E	250	300	IV	VB
6	Bucklands	33°05′S, 26°43′E	300	400	IV	VB
7	Fairview	32°31′S, 23°59′E	800	300	IV, IV A	KB, FU
8	Glenconnor	33°24′S, 25°10′E	200	300–400	IV	VB
9	Graaff-Reinet	32°15′S, 24°32′E	750	300	IV	SM
10	Grootfontein	31°27′S, 25°02′E	1 300	300–400	IV A	FU
11	Homestead	33°38′S, 22°23′E	350	200–300	VII A IV	FS, SM
12	Jansenville	32°56′S, 24°40′E	470	200–300	IV	N
13	Jouberts Kraal	32°44′S, 25°06′E	700	300	IV	KB
14	Kendrew	32°32′S, 24°31′E	600–650	300	IV	CL
15	Kudu Reserve	33°07′S, 26°43′E	350	400	IV	VB
16	Libertas	32°23′S, 25°01′E	950–1 000	400–500	IV, IV A	FU, CL, KB, FK
17	Middelburg	31°30′S, 25°00′E	1 250	300–400	IV A	FU
18	Mt. Zebra Park	32°16′S, 25°26′E	1 400–1 957	400–500	IV A	FU, FK
19	Oudtshoorn	33°36′S, 22°12′E	350	200	IV	KB
20	Pearston	32°35′S, 25°09′E	700	300–400	IV A	FU
21	Somerset East	32°44′S, 25°35′E	750	600	III A, IV A	FT, FU
22	Steytlerville	33°20′S, 24°21′E	450	200	IV	SM
23	Table Farm	33°15′S, 26°25′E	550	600	IV	VB
24	Tandjiesberg	32°18′S, 24°42′E	1 530	400	IV	SM
25	Uitenhage	33°45′S, 25°24′E	100	400–500	IV	VB
26	Ulster Farm	33°10′S, 26°39′E	250–300	400	IV	VB
27	Waldeck Farm	32°44′S, 25°59′E	750	400–500	IV A	FK

[a] according to Acocks (1975)

Vegetational type

III A = False Bushveld
IV = Karoo & Karoid Bushveld
IV A = False Karoo types
VII A = False Sclerophyllous bush types

Vegetational category

III A – FT = False Thornveld of Eastern Cape
IV – VB = Valley Bushveld
KB = Karoid Broken Veld
CL = Central Lower Karoo
SM = Succulent Mountain Scrub
N = Noorsveld
IV A – FU = False Upper Karoo
FK = False Karoid Broken Veld
VII A – FS = Succulent Mountain Scrub and False Macchia

* Locations with weather stations

TABLE 4 The composition of vegetational types and vegetational categories expressed as a percentage at localities where *Rhipicephalus glabroscutatum* has been recorded

A. *Vegetational types*		B. *Vegetational categories*	
Karoo & Karoid Bushveld	66%	Valley Bushveld	21%
		Karoid Broken Veld	18%
		Central Lower Karoo	10,5%
		Succulent Mountain Scrub	10,5%
		Noorsveld	3%
False Karoo	28%	False Upper Karoo	21%
		False Karoid Broken Veld	10%
False Bushveld	3%	False Thornveld of Eastern Cape	3%
False Sclerophyllous Bush	3%	Succulent Mountian Scrub and False Macchia	3%

TABLE 5 The mean daily temperatures* recorded at selected stations

Station(s)	Region	Maximum °C	Minimum °C	Average range
Great Fish	Coast	21,9	14,1	7,8
Grahamstown/Somerset East	Coastal plateau	23,1/24,5	9,7/10,6	13,7
Graaff-Reinet/Jansenville	Karoo	25,9/26,9	11,3/11,0	15,3
Grootfontein/Cradock	Midlands	23,1/24,7	6,2/8,4	16,6

* From Badenhorst (1970)

A detailed ecological study of this species is currently in progress at Brakhill, and initial results indicate a single generation per annum. Free-living larvae are present on vegetation in autumn and winter (February–July), immatures on goats from late autumn to the end of spring (April–October) and adults on goats from the beginning of spring to the middle of summer (August–December) (K. MacIvor, unpublished data, 1983; MacIvor & Horak, 1984).

Adults have also been recorded in peak numbers during November on kudu at the Bucklands and Ulster farms (Knight & Rechav, 1978).

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