Rhipicephalus interventus sp. nov. (Acari: Ixodidae), a new tick species closely related to *Rhipicephalus tricuspis* Dönitz, 1906 and *Rhipicephalus lunulatus* Neumann, 1907, from East and Central Africa

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ABSTRACT

WALKER, JANE B., PEGRAM, R.G. & KEIRANS, J.E. 1995. *Rhipicephalus interventus* sp. nov. (Acari: Ixodidae), a new tick species closely related to *Rhipicephalus tricuspis* Dönitz, 1906 and *Rhipicephalus lunulatus* Neumann, 1907, from East and Central Africa. *Onderstepoort Journal of Veterinary Research*, 62:89–95

Descriptions of the adults of this new species are given, together with information on its hosts and distribution. Previously it was referred to briefly by Walker, Keirans, Pegram & Clifford (1988), who noted that in many respects it is intermediate in appearance between *R. tricuspis* and *R. lunulatus*.

Keywords: *Rhipicephalus interventus, Rhipicephalus tricuspis* Dönitz, 1906, *Rhipicephalus lunulatus* Neumann, 1907

INTRODUCTION

In 1988 Walker, Keirans, Pegram & Clifford published a review of the *Rhipicephalus* species whose males have tricuspid adanal plates. Earlier, Theiler (1962) regarded all these ticks as members of one species, *Rhipicephalus tricuspis* Dönitz, 1906, but this view was never universally accepted. Walker *et al.* (1988) concluded that there are three species in this group: *R. tricuspis sensu stricto* and *Rhipicephalus lunulatus* Neumann, 1907, which they redescribed from complete series of laboratory-reared specimens, plus an unnamed entity that they had seen in various collections from East and Central Africa and originally identified as either *R. tricuspis* or *R. lunulatus*.

As yet, only the adults of this third entity are known. In various respects they are morphologically intermediate in appearance between the adults of *R. tricuspis* and *R. lunulatus*. We therefore propose the specific name *interventus*, a Latin term meaning "to come between", for this new species. The following are descriptions of its adults.

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DESCRIPTIONS

Measurements of the ticks are given in mm.

Rhipicephalus interventus Walker, Pegram & Keirans, sp. nov.

Synonyms

Rhipicephalus tricuspis sensu Yeoman & Walker, 1967 (in part). *The ixodid ticks of Tanzania*: 168–170.

Rhipicephalus tricuspis sensu Matthysse & Colbo, 1987. *The ixodid ticks of Uganda*: 326–332, plates 141 and 166, Fig. 8.

MALE (Fig. 1a, 2a–c)

CAPITULUM (Fig. 2a). Very slightly broader than long, length x breadth varying from 0,48 x 0,51 to 0,52 x 0,54 mm.

BASIS CAPITULI. About twice as broad as long; length (including cornua) x breadth varying from 0,24 x 0,51 to 0,30 x 0,54 mm. Anterolateral margins nearly straight, diverging posteriorly; posterolateral margins longer than anterolateral, slightly concave and convergent; lateral angles fold forward over anterior process of coxa I; cornua bluntly triangular; posterior margin between cornua slightly concave; very small punctations scattered irregularly over the dorsum of the basis; a few larger punctations centrally and laterally, each with a small white seta.

PALPS. Article I with a very short pedicel visible dorsally; articles II and III about the same length, both about 1,5 times as broad as long.

CONSCUTUM. Length x breadth varying from 2,17 x 1,40 to 2,36 x 1,52 mm, inornate, brown. Shape as illustrated (Fig. 1a), narrow anteriorly, broadening posterior to eyes. In engorged specimens body wall expands posteriorly and posterolaterally. Anterior process of coxa I visible from dorsal surface. (In Fig. 2a the anterior process is not present on the left side because segments of leg I are missing.) Eyes about one third of way back, marginal, flat, edged with a few moderate-sized punctations. Cervical pits moderately deep, comma-shaped; external cervical margins indicated by a few large punctations, each with a minute white seta. Marginal lines shallow with a few punctations, delimiting first festoons and extending forward to just behind eyes.

Posteromedian and posterolateral grooves poorly developed or absent. When present, posteromedian groove is short, narrow and slightly depressed, and posterolaterals are slight circular depressions; a few other slight depressions may be present anterior to posterolaterals. Moderately large punctations present on scapulae, in four rows ("*simus*" pattern) on central part of conscutum and around posteromedian and posterolateral grooves, most with a minute white seta; background smooth, impunctate.

LEGS (Fig. 1a). Do not increase in size from I–IV.

VENTRAL SURFACE–SPIRACLE (Fig. 2b). Broadly comma-shaped, with a rather wide dorsal prolongation; goblet cells numerous but not closely aligned.

ADANAL PLATES (Fig. 2c). Elongate, internal margin indented posterior to anus; posterointernal margin broadly rounded; posteroexternal margin usually extended into a long narrow cusp. Accessory plates long, narrowly triangular and extending posteriorly almost to the apex of the posteroexternal adanal cusp.

FEMALE (Fig. 1b, 2d–f)

CAPITULUM (Fig. 2d). Broader than long; length x breadth varying from 0,55 x 0,63 to 0,71 x 0,74 mm.

BASIS CAPITULI. More than twice as broad as long, length x breadth varying from 0,25 x 0,63 to 0,33 x 0,74 mm; anterolateral margins nearly straight to slightly convex, divergent; posterolateral margins concave, convergent; posterior margin straight; cornua small. Porose areas approximately oval, *c.* 1,5 times their diameter apart. A few short white setae lateral to porose areas.

PALPS. Article I with a fairly narrow, moderately elongate pedicel, giving palps a slightly stalked appearance; article II longer than article III.

BODY (Fig. 1b). In unfed specimens, length from scapular apices to posterior body margin x breadth 2,40 x 1,60 to 2,83 x 2,00 mm. Marginal grooves of alloscutum delimiting first two festoons; posteromedian and paramedian grooves narrow, elongate, reaching from festoons to midlength.

SCUTUM (Fig. 2e). Length x breadth varying from 1,25 x 1,22 to 1,43 x 1,46 mm. Inornate, brown, shape as illustrated; posterior margin broadly rounded, emargination broad and deep. Eyes at lateral scutal angle, flat to very slightly raised from scutal surface, edged dorsally with a few punctations. Cervical pits moderately deep, comma shaped; internal cervical margins shallow, initially converging then diverging posterolaterally; external cervical margins indicated by a row of deep punctations, each with a short white seta; cervical fields very slightly depressed. Punctations in lateral fields large with setae; numerous small punctations scattered over scutum.

LEGS (Fig. 1b). Do not increase in size from I–IV.

VENTRAL SURFACE–SPIRACLE. Short, ovoid, with a short, broad dorsal prolongation.

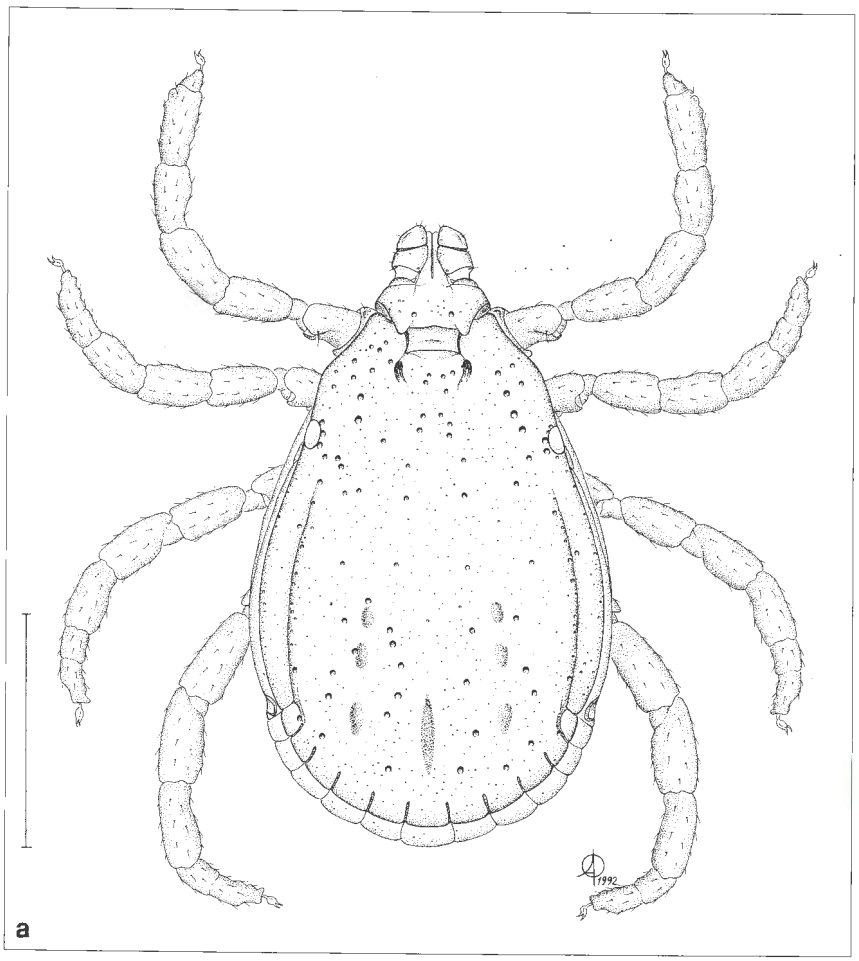
GENITAL APERTURE (Fig. 2f). Situated between coxae II, broadly U-shaped with smooth hyaline flaps visible laterally.

IMMATURE STAGES. Unknown.

HOLOTYPE. ♂ from collection off cattle, Kawoko-Masaka, Masaka District (00°30′S, 31°35′E), Uganda, on 2 March 1967 by J.G. Matthysse, deposited in the United States National Tick Collection, RML 53849.

ALLOTYPE. ♀, data as above.

PARATYPES. 2♂♂, 7♀♀, data as above; Tanzania Tick Collection IR/47, 2 ♂♂, 8 ♀♀ collected from cattle,



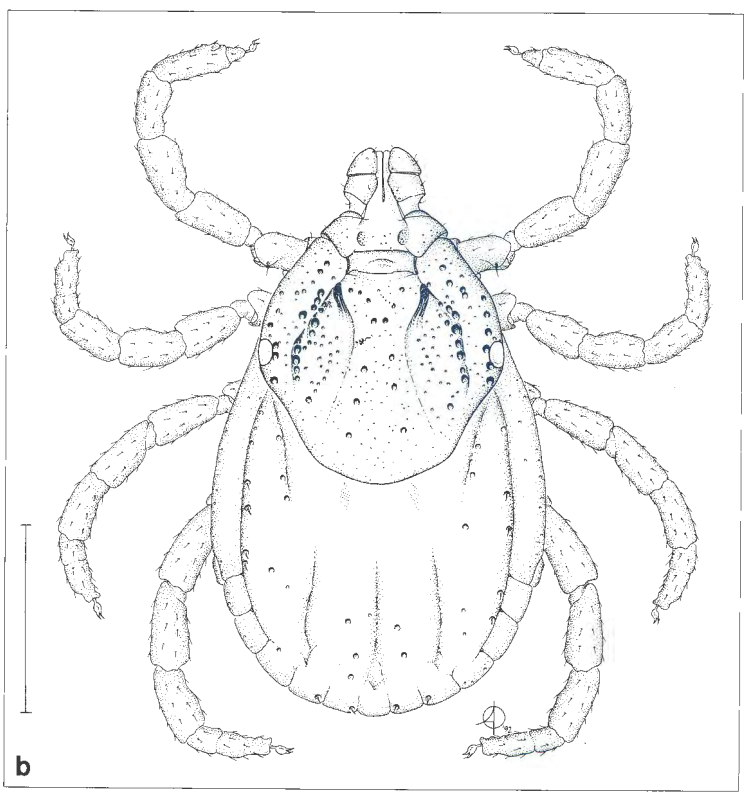


FIG. 1 *Rhipicephalus interventus* sp. nov. [RML 53849 (AHRC 67/2854)]. a. **Male**, dorsal view. b. **Female**, dorsal view. A. Olwage *del.*

Scale bars represent 1 mm

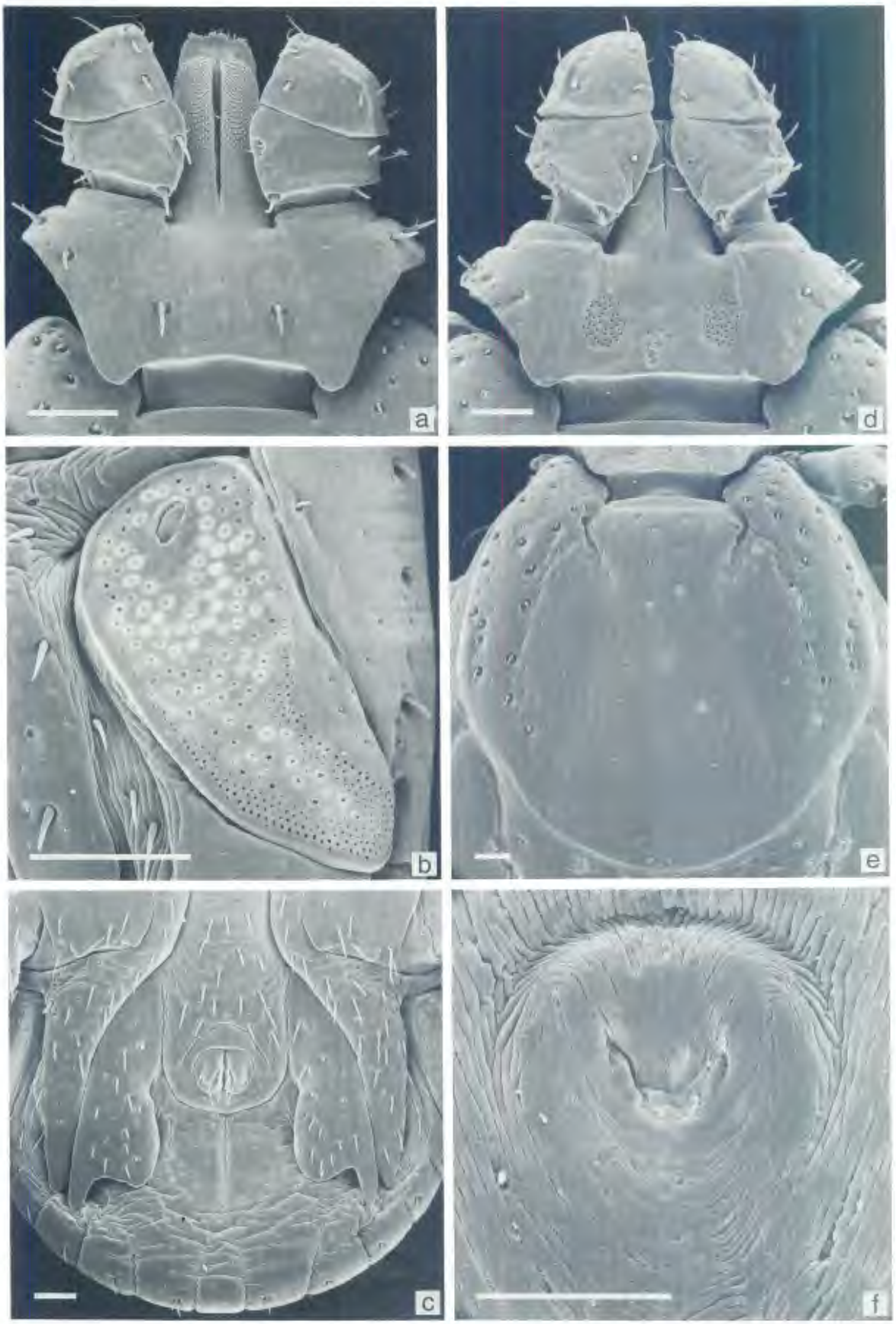

a
d
b
e
c
f

FIG. 2 *Rhipicephalus interventus* sp. nov. [RML 117418 (AHRC 67/3058)]. **Male:** a. Capitulum, dorsal. b. Spiracle. c. Adanal plates. **Female:** d. Capitulum, dorsal. e. Scutum. f. Genital aperture. SEMs by R.G. Robbins. Scale bars represent 0,1 mm. [Fig. a and c reprinted with permission from Matthysse & Colbo (1987). *Ixodid ticks of Uganda*. Entomological Society of America]

Igula village, Ihimbu Gunguli (07°50′S, 35°47′E) on 31 December 1960 by Veterinary Assistant Robert, deposited in the Natural History Museum, London; Collection TC 666, 1 ♂, 2 ♀♀ collected from bovine, Lutale, Mumbwa (15°16′S, 26°50′E), Zambia, in December 1981 by R.G. Pegram, deposited in the Onderstepoort Tick Collection, OP 3144i.

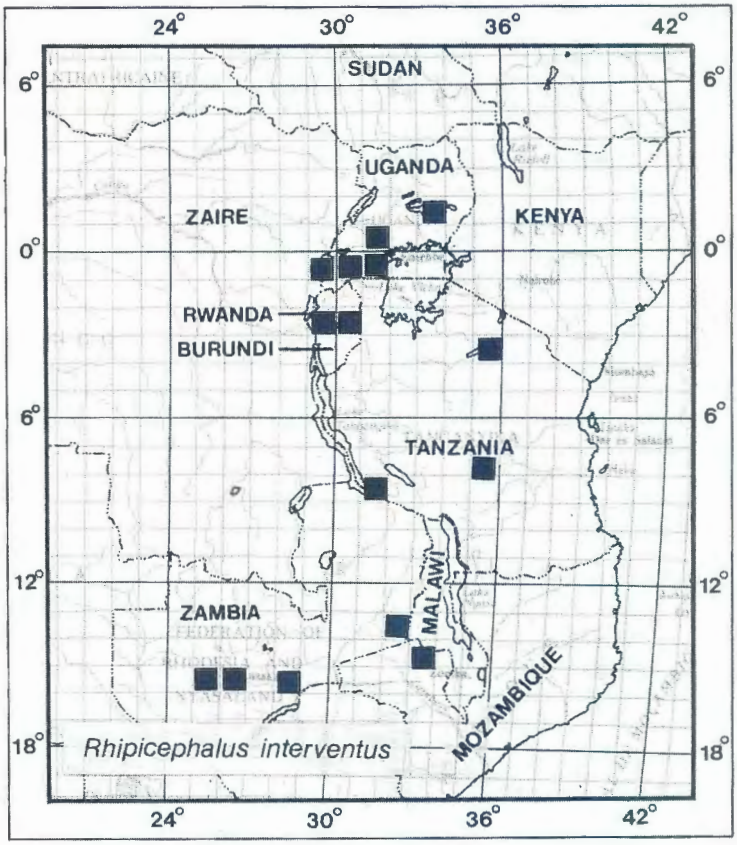


FIG. 3 *Rhipicephalus interventus* sp. nov.—distribution

DIFFERENTIATION OF *R. INTERVENTUS* SP. NOV. FROM *R. TRICUSPIS* AND *R. LUNULATUS*

A comparison of the illustrations of *R. interventus* given here with those of the other two species in Walker *et al.* (1988) shows some of the morphological differences between these three entities.

The male of *R. interventus* resembles that of *R. tricuspis* in the shape of its basis capituli and its short palps, but its relatively long, narrow adanal plates, with their elongated posteroexternal cusps and broadly rounded posterointernal margins, are much closer in shape to those of *R. lunulatus*. Its spiracular plate, with its relatively short, broad dorsal projection, differs from that of *R. tricuspis* as well as of *R. lunulatus*, in both of which the dorsal projections of the spiracular plates are longer and narrower.

It may be more difficult to differentiate the females of *R. interventus* from those of *R. tricuspis* since both these species have similar capituli and genital apertures, but the small interstitial punctations on the scutum of *R. interventus* are generally sparser than they are in *R. tricuspis*. The female of *R. interventus* can, however, be readily distinguished from that of *R. lunulatus*, which has comparatively longer, narrower palps and a broader, shallower genital aperture.

BIOLOGY IN THE FIELD

Hosts

Thirty-five confirmed collections of *R. interventus* exist at present (Table 1). Of these, 25 are from cattle; six from various medium-sized to small antelopes, including bushbuck (*Tragelaphus scriptus*), topi (*Damaliscus lunatus topi*), oribi (*Ourebia ourebi*), grysbok (*Raphicerus melanotis*), and Grant's gazelle (*Gazella granti*); one from domestic sheep; two from dogs; and one from pasture. It is apparently not an abundant tick. The two largest collections, both from an unspecified number of cattle, contain only 11 adults. Most collections are much smaller, many consisting of a single specimen only.

Zoogeography

The collections of *R. interventus* that we have seen are from Uganda, Tanzania, Rwanda, Zambia and Malawi (Table 1, Fig. 3). It is sometimes sympatric with *R. lunulatus* (Walker *et al.* 1988). Judging by the specimens that we have confirmed, it occurs mainly in various types of woodland (*miombo*), wooded grassland and sometimes grassland (White 1983).

TABLE 1 *Rhipicephalus interventus* sp. nov.—material examined

Depository and accession no.	No. of ticks ♂	No. of ticks ♀	Host	Locality	Date of collection	Collector
UGANDA						
RML 53823[a]	2	3	Cattle	Muko, Ankole (00°28′S, 30°45′E)	17 Sept. 1965	J.G. Matthysse
RML 53829[a]	4	7	Cattle	Katakwi Prison, Teso (01°55′N, 33°57′E)	11 May 1967	J.G. Matthysse
RML 53849[a]	3	8	Cattle	Kawoko–Masaka, Masaka District (00°30′S, 31°35′E)	2 March 1967	J.G. Matthysse
RML 53862[a]	1	1	Cattle	Ruizi, Ankole (00°34′S, 30°47′E)	27 Jan. 1966	J.G. Matthysse
RML 66028[a]	1		*Tragelaphus scriptus*	Rwenzori National Park, Kasenyi (probably 00°02′S, 30°08′E)	20 Jan. 1971	M.H. Woodford
RML 117418[a]	1	2	Cattle	W. Mako, Masaka (00°08′N, 31°10′E)	12 May 1967	J.G. Matthysse
RML 117419[a]	1		*Ourebia ourebi*	Ruizi, Ankole	22 Nov. 1965	J.G. Matthysse
RML 117428[a]		1	Bovine	Ntusi, Masaka (01°01′N, 31°15′E)	24 March 1966	J.G. Matthysse
RML 117429[a]		1	Bovine	W. Makole, Masaka	12 May 1967	J.G. Matthysse
RML 117430[a]		1	Bovine	Rushozi Dam (= Muko), Ankole (00°28′S, 30°45′E)	24 June 1966	J.G. Matthysse
RML 117438[a]		1	Bovine	Ruhengere, Ankole (00°20′S, 30°50′E)	22 April 1966	J.G. Matthysse
RML 117439[a]	1	1	Cattle	Rushozi Dam, Ankole	22 April 1966	J.G. Matthysse
RML 11744[a]	1		Bovine	Rushozi Dam, Ankole	24 June 1966	J.G. Matthysse
RML 117453[a]		2	Cattle	Ruizi, Ankole	1 April 1966	J.G. Matthysse
RML 117455[a]		3	Cattle	Rushozi Dam, Ankole	31 March 1966	J.G. Matthysse
RML 117456[a]	1		Bovine	Ntusi, Masaka	25 Jan. 1966	J.G. Matthysse
—[b]	1	1	*Damaliscus lunatus topi*	Queen Elizabeth National Park (00°15′S, 30°00′E)	12 Sept. 1961	P.D.L. Guilbride
TANZANIA						
W/WA/189[c]	1	1	*Gazella granti*	Ngorongoro Crater (03°10′S, 35°35′E)	21 Feb. 1961	J.B. Walker
BI/11[c]		1	Bovine	Kasherazi village (02°31′S, 30°48′E)	18 Jan. 1960	G.H. Yeoman
IR/47[c]	2	8	Cattle	Igula village, Ihimbu Gunguli (07°50′S, 35°47′E)	31 Dec. 1960	Vet. Asst. Robert
RWANDA						
T 82850/82865[d]	3	6	"Antilope"	Butare (formerly Astrida) (02°36′S, 29°44′E)	1952	P.H. Vercammen
ZAMBIA						
TC 167[e]		1	Bovine	Lutale, Mumbwa (15°16′S, 26°50′E)	Dec. 1980	R.G. Pegram
TC 168[e]		1	Bovine	Lutale, Mumbwa	Dec. 1980	R.G. Pegram
TC 169[e]		2	Bovine	Lutale, Mumbwa	Dec. 1980	R.G. Pegram
TC 666[e]	1	2	Bovine	Lutale, Mumbwa	Dec. 1981	R.G. Pegram
TC 124[e]		1	Bovine	K.R.A., Mumbwa (*c.* 15°05′S, 26°42′E)	Nov. 1980	R.G. Pegram
TC 317[e]		1	Bovine	K.R.A., Mumbwa	March 1981	R.G. Pegram
MC 19–2[e]		2	Bovine	Mbala Ranch (08°50′S, 31°22′E)	20 Nov. 1980	R.G. Pegram
MC 19–3[e]		1	Bovine	Mbala Ranch	20 Nov. 1980	R.G. Pegram
MC 19–4[e]		8	Sheep	Mbala Ranch	20 Nov. 1980	R.G. Pegram
MC 22[e]	1	1	Dogs	Mbala Ranch	Nov. 1980	R.G. Pegram
MC 30[e]	1		Dog	Balmoral (15°32′S, 28°12′E)	26 Dec. 1980	R.G. Pegram
MC 86[e]		1	Pasture	Ngoma, Kafue National Park (15°56′S, 25°57′E)	3 Dec. 1981	R.G. Pegram
	1		*Raphicerus melanotis*	Chipangali (*c.* 13°10′S, 32°46′E)	20 April 1962	F. Zumpt
MALAWI						
Nuttall 730[c]	1		Bovine	Ohilindi village, near Kanyezi Hill (14°18′S, 33°59′E)	14 Nov. 1909	J.B. Davey

[a] U.S. National Tick Collection
[b] J.B. Walker collection
[c] Natural History Museum, London
[d] Musée Royal de l'Afrique Centrale, Tervuren
[e] Onderstepoort Tick Collection, Onderstepoort Veterinary Institute

In Uganda, where it was referred to by comparison with *R. lunulatus* as "the smaller upland tick of Masaka, Ankole and Kigezi districts" (Matthysse & Colbo 1987), it has been collected most commonly in dry, wooded grassland dominated by *Acacia*.

As Walker *et al.* (1988) pointed out, there are many publications which include records of *R. tricuspis* and *R. lunulatus* that have not been verified since the *R. tricuspis* group was revised. There is little doubt that some of these records refer to *R. interventus,* but the present whereabouts of many specimens on which they were based, if they still exist, is unknown. In the case of Tanzania it has been possible to re-examine only a few of the collections containing ticks listed by Yeoman & Walker (1967) as *R. tricuspis*, of which three included *R. interventus* (Table 1). Other publications in which records that may refer to *R. interventus* appear, are as follows: *Zaire* (as *R. lunulatus*: Massey 1908; as *R. tricuspis*: Schwetz 1927; Fain 1949; Theiler & Robinson 1954; Theiler 1962; Clifford & Anastos 1962, 1964, in part; Elbl & Anastos 1966, in part); *Rwanda* (as *R. tricuspis*: Theiler & Robinson 1954; Van Vaerenbergh 1954; Elbl & Anastos 1966, in part); *Tanzania* (as *R. tricuspis*: Zumpt 1943); *Zambia* (as *R. tricuspis*: MacLeod 1970; MacLeod, Colbo, Madbouly & Mwanaumo 1977; MacLeod & Mwanaumo 1978), and *Malawi* (as *R. tricuspis*: Berggren 1978).

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