



# Adaptación de Parásitos a Nuevos Hospederos y la Necesidad de su Incorporación en el Diagnóstico por Laboratorio

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PhD. en Salud Pública

Escuela de Microbiología

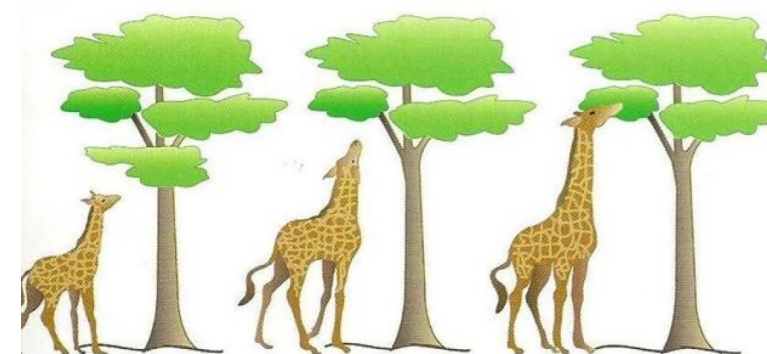
Grupo de Investigación en microbiología veterinaria

Grupo de investigación en salud y sostenibilidad



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¿Somos conscientes de la evolución de los microorganismos en su adaptación al parasitismo?

¿Qué estamos diagnosticando? ¿lo que por tradición sabemos que se debe reportar? ¿me cuestiono cuando veo algo diferente?

¿seguimos con rigurosidad el concepto de enfermedad exótica? ¿es un fenómeno estático?

¿consideramos el impacto de las importaciones de animales y las deficiencias en programas de vigilancia epidemiológica?

¿hay real y permanentemente una conexión entre los profesionales del laboratorio clínico veterinario y la generación de nuevo conocimiento?





**Presentación de casos**

Hechos Microbiol. 2011; 2(2): 81-87.  
 © 2011 por la Universidad de Antioquia  
<http://www.udea.edu.co/hm>

**Tripanosomiasis bovina en hembra de raza especializada en producción de leche de zona alto andina, Antioquia: presentación de un caso**

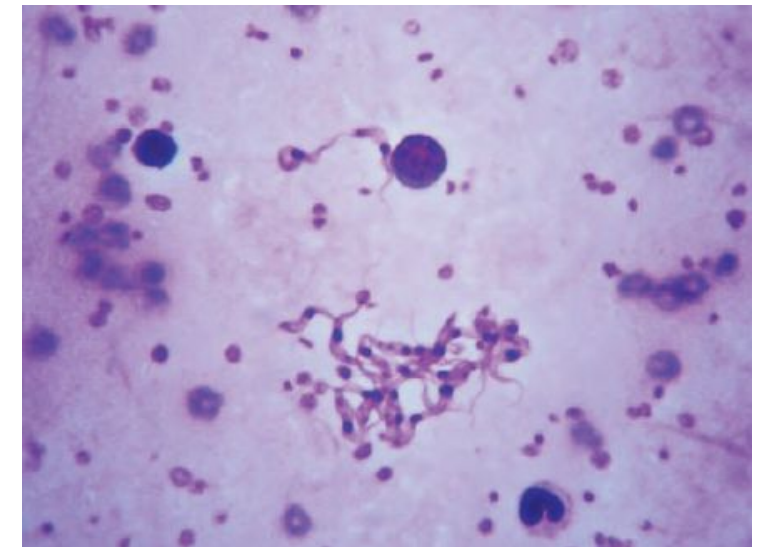
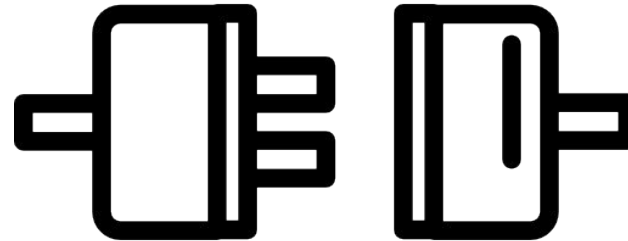
Bovine trypanosomiasis in female breed dairy cattle of region high Andean, Antioquia: a case report

Richard Zapata S.\*, Julián Reyes V.†

doi: <http://dx.doi.org/10.19052/mv.4048>

Tripanosomiasis bovina en ganadería lechera de trópico alto: primer informe de *Haematobia irritans* como principal vector de *T. vivax* y *T. evansi* en Colombia

Richard Zapata Salas<sup>1</sup> / Edison Alberto Cardona Zuluaga<sup>2</sup> / Julián Reyes Vélez<sup>3</sup> / Omar Triana Chávez<sup>4</sup> / Víctor Hugo Peña García<sup>5</sup> / Leonardo Alberto Ríos Osorio<sup>6</sup> / Rolando Barahona Rosales<sup>7</sup> / Diana Polanco Echeverry<sup>8</sup>



## ORIGEN DEL PARASITISMO

Preadaptación:

**Coincidencia ecológica:**

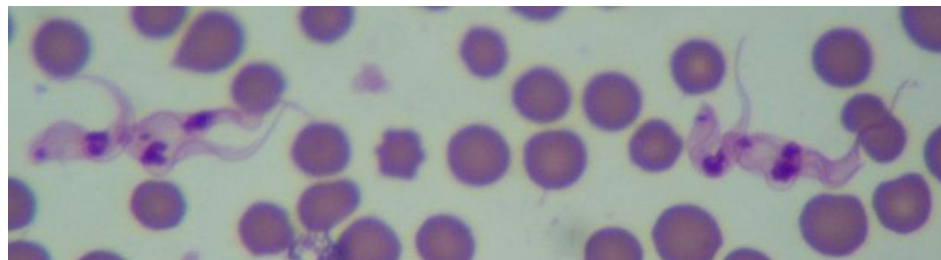
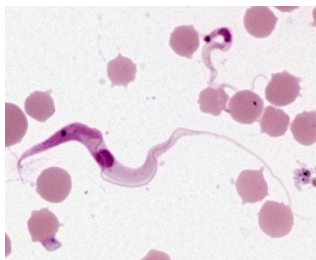


### Vencimiento de barreras antiinvasivas:

Ectoparásitos: rápido (adaptación a plantas y animales)

Endoparásitos: diversas puertas de entrada

barreras: mecánicas, presión osmótica, temperatura, baja presión de oxígeno, pH, enzimas, inmunidad celular y humoral.



**Inocuidad relativa de los primeros niveles:**

Inicialmente asociación no muy perjudicial



# Tricomonanos en perros y gatos

Veterinary Parasitology 187 (2012) 319–322



Contents lists available at SciVerse ScienceDirect

Veterinary Parasitology

journal homepage: [www.elsevier.com/locate/vetpar](http://www.elsevier.com/locate/vetpar)



Short communication

Species identification of trichomonads and associated coinfections in dogs with diarrhea and suspected trichomonosis

M.K. Tolbert<sup>a</sup>, C.M. Leutenegger<sup>b</sup>, R. Lobetti<sup>c</sup>, J. Birrell<sup>d</sup>, J.L. Gookin<sup>a,\*</sup>

<sup>a</sup> Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, United States

<sup>b</sup> IDEXX Laboratories, Inc., West Sacramento, CA, United States

<sup>c</sup> Bryanston Veterinary Hospital, Bryanston, South Africa

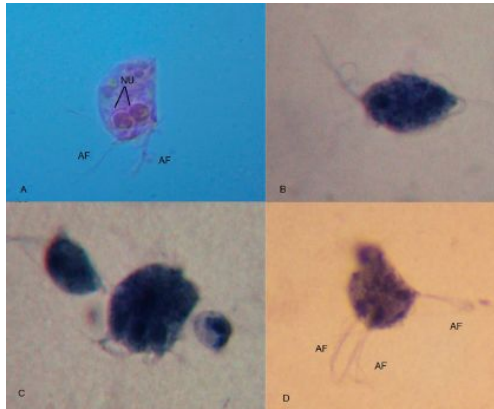
<sup>d</sup> South African Police Services Veterinary Hospital, Roodeplaat, South Africa

**Diagnosis of *Pentatrichomonas hominis* from domestic cats in Southeastern Brazil\***

Caroline S. dos Santos<sup>1\*</sup>, Douglas McIntosh<sup>2</sup>, Bruno P. Berto<sup>3</sup>, Vera Lúcia T. de Jesus<sup>4</sup>, Cristiane N.C. da Rocha<sup>5</sup>, Júlio I. Fernandes<sup>6</sup>, Fábio B. Scott<sup>7</sup> and Carlos Wilson G. Lopes<sup>8</sup>



*Tritrichomonas foetus*



*Pentatrichomonas hominis*



¿Estamos aplicando las técnicas diagnósticas apropiadas?  
 ¿No lo encontramos porque no está? ¿O porque no lo sabemos buscar?  
 ¿utilizamos muestras frescas?



RESEARCH

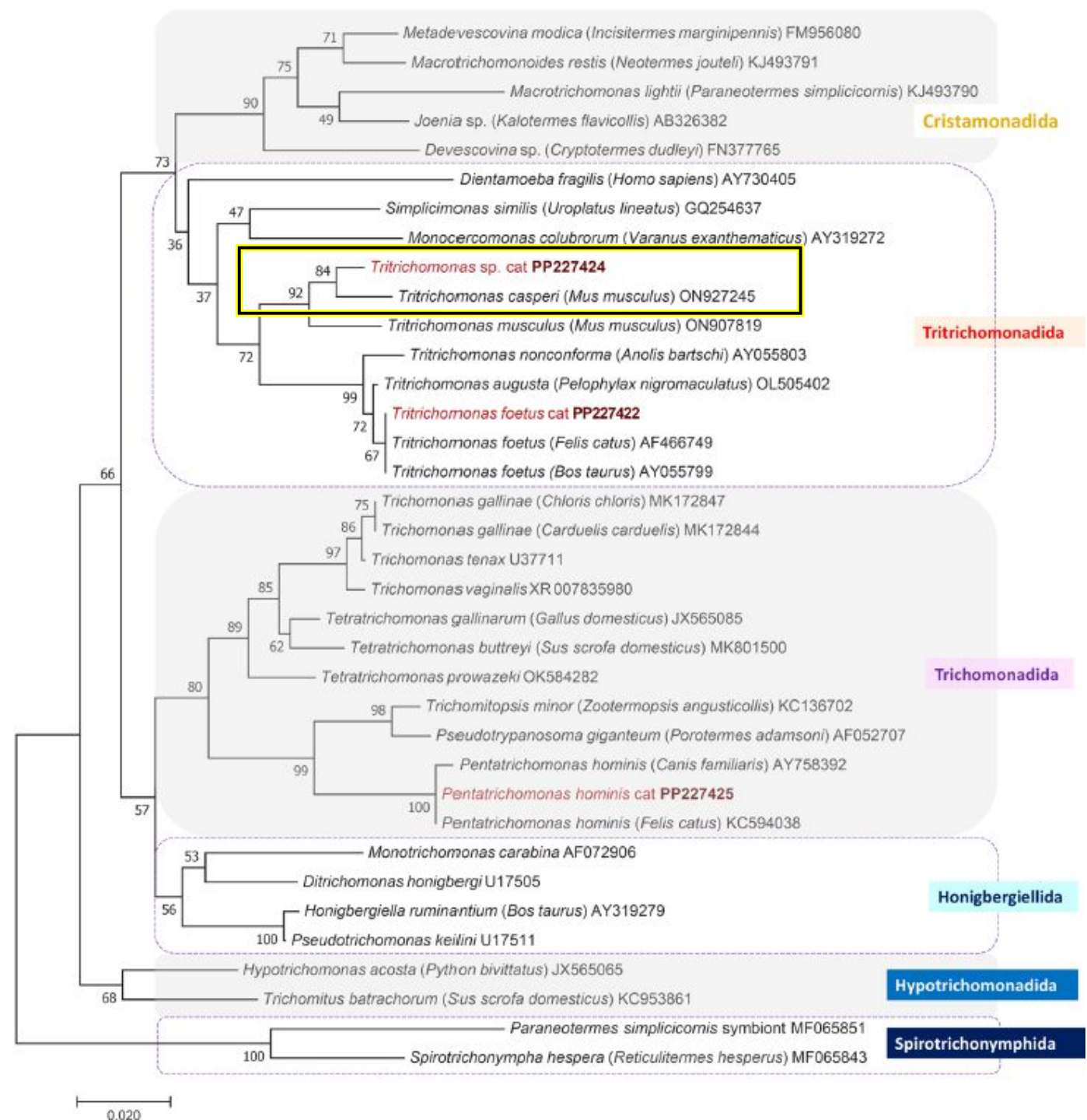
Open Access

# Molecular-phylogenetic investigation of trichomonads in dogs and cats reveals a novel *Tritrichomonas* species

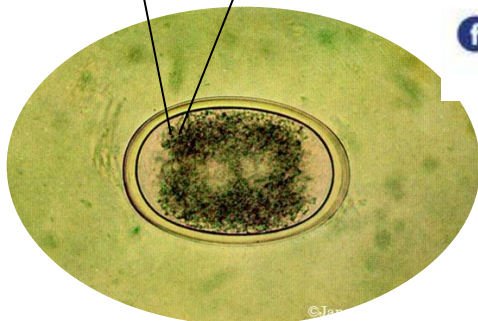
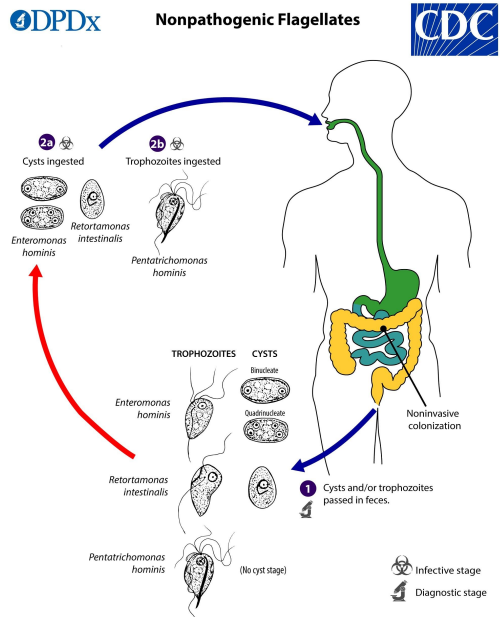
Barbara Tuska-Szalay<sup>1\*</sup>, Julia Gilbert<sup>1</sup>, Nóra Takács<sup>1,2</sup>, Sándor A. Boldogh<sup>3</sup>, József Fáy<sup>4</sup>, Ágnes Sterczer<sup>5</sup>, Roland Psáder<sup>5</sup>, Jenő Kontschán<sup>6,7</sup>, Ádám Izsó<sup>8</sup> and Sándor Hornok<sup>1,2</sup>

Especie de *Tritrichomonas* del intestino grueso hasta ahora.

1. nuevo genotipo – pseudoparásito.
2. Nuevo genotipo infectante para gatos.

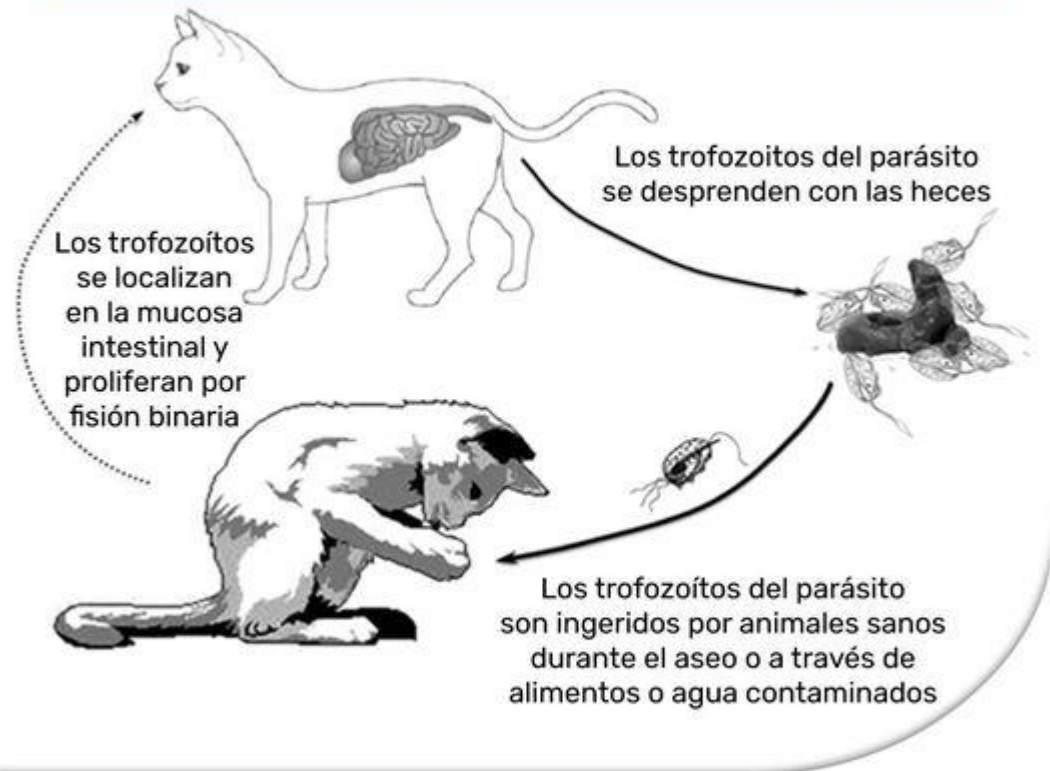


## *Histomonas meleagridis*



## ¿Cuál es su ciclo de vida?

### Ciclo de vida *Tritrichomonas foetus*

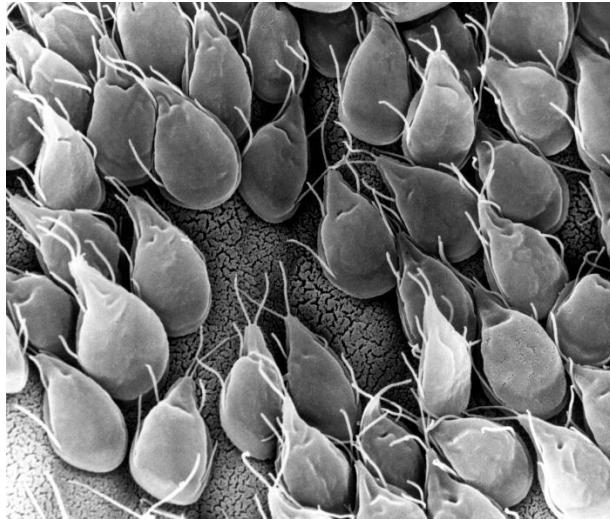


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Food Research International

Volume 52, Issue 1, June 2013, Pages 119–135



Review

Global occurrence of *Cryptosporidium* and *Giardia* in shellfish: Should Canada take a closer look?

Jessica E. Willis<sup>a</sup>, JT. McClure<sup>b</sup>, Jeff Davidson<sup>b</sup>, Carol McClure<sup>b</sup>, Spencer J. Greenwood<sup>a</sup>

Show more

# Giardia duodenalis

Int J Parasitol. 2001 Jan;31(1):73-9.

**Giardiasis in dairy calves: effects of fenbendazole treatment on intestinal structure and function.**

O'Handley RM<sup>1</sup>, Buret AG, McAllister TA, Jelinski M, Olson ME.

Author information

Abstract

Twelve *Giardia duodenalis*-infected Holstein dairy calves were allocated into a treatment (n=6) and placebo group (n=6) according to pre-study faecal cyst counts. Calves in the treatment group received an oral dose of 5 mg/kg fenbendazole once daily for 3 days, while placebo calves received a sterile saline solution. Calves were euthanised 7 days following the initiation of treatment and intestinal were collected and prepared for trophozoite quantitation, histology, electron microscopy, and disaccharidase assays. In all calves treated with fenbendazole, intestinal trophozoites were below detection limits, while in saline-treated calves, trophozoites were observed in all intestinal segments. Histologically, no significant difference was observed between treatment groups with respect to intestinal villus height or crypt depth. However, a significant decline in the number of intraepithelial lymphocytes (IEL) was observed in fenbendazole-treated calves when compared with placebo-treated calves in the duodenum (13.9+/-1.2 vs. 17.0+/-1.1 IEL/100 enterocytes) and jejunum (21.6+/-0.8 vs. 30.7+/-1.0 IEL/100 enterocytes). In addition, measurements from TEM micrographs demonstrated a significant increase in microvillus surface area in the jejunum of fenbendazole-treated calves compared with saline-treated calves (31.2+/-10.2 vs. 22.8+/-7.6 microm<sup>2</sup>). This increase in microvillus surface area was also associated with an increase in jejunal maltase activity in fenbendazole-treated calves compared with calves treated with saline. These results demonstrate that fenbendazole is an effective treatment for giardiasis in calves; fenbendazole treatment eliminated *Giardia* trophozoites from the small intestine of calves resulting in increased microvillus surface area and greater intestinal enzyme activity. This study also demonstrates that the pathogenesis of giardiasis in calves is similar to that observed in humans and laboratory animals, and provides further evidence that *Giardia* is a pathogen of cattle with potential economic importance.

PMID: 11165274 [PubMed - indexed for MEDLINE]

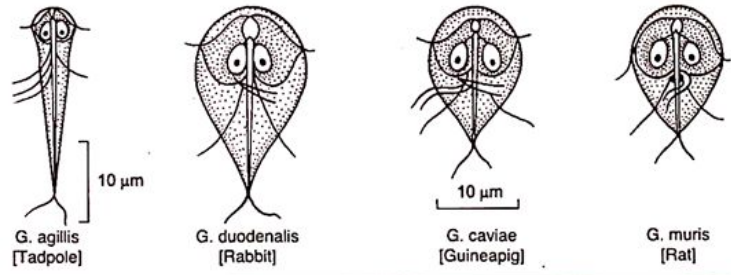


Fig. 2.4: *Giardia* species commonly found in laboratory animals



Parásitos intestinales en fauna exótica y silvestre del zoológico Santa Fe, Medellín, Colombia.

Intestinal parasites in wild and exotic animals at the zoo Santa Fe, Medellin-Colombia, 2010.

Nelfi Isabel Oyola, Richard Zapata, Giovanni Alexander Torres, Leonardo Alberto Ríos, Mario Augusto Zapata.



Genotipo A de *G. intestinalis* en chigüiro



Genotipo B en mono aullador

## Chapter Six - Molecular epidemiology of giardiasis from a veterinary perspective

Una Ryan  , Alireza Zahedi

Ocho especies de *Giardia*:

*Giardia duodenalis*

*Giardia agilis*

*Giardia ardeae*

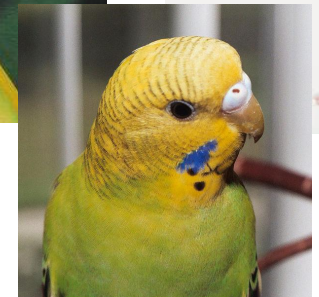
*Giardia psittaci*

*Giardia muris*

*Giardia microti*

*Giardia peramelis*

*G. cricetidarium*



## Chapter Six - Molecular epidemiology of giardiasis from a veterinary perspective

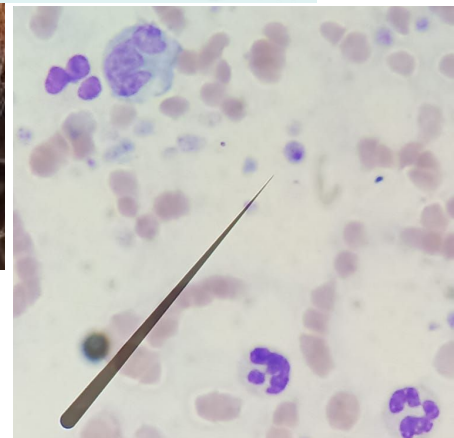
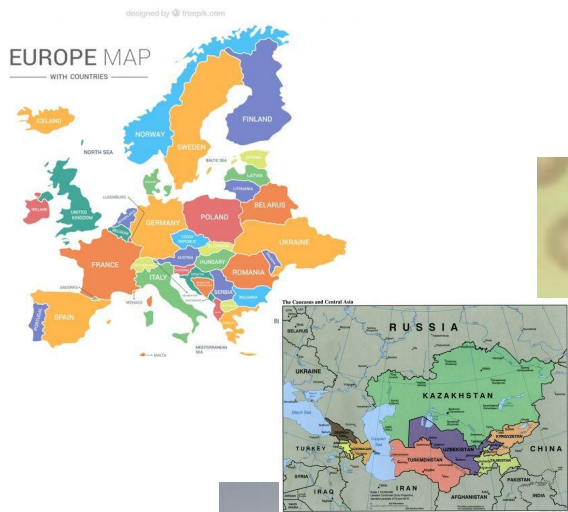
Una Ryan , Alireza Zahedi

**Table 2** Reports of *Giardia duodenalis* prevalence and assemblages in livestock since 2012.<sup>a</sup>—cont'd

Animal	Location	No of samples	Prevalence (%)	No of samples typed			Animal	Location	No of samples	Prevalence (%)	No of samples typed	Assemblages				References		
				A	B	E						A	B	E	Other			
Cattle	Uganda	45	4.4	1	0	0										fixed A and E (n=4)	Jin et al. (2017)	
Cattle	UK	283	32.9	63	16	0	Goats	China	506	6.3	23	0	0	23	0		fixed E and A (3)	Wang et al. (2016b)
Cattle	US	2109	23.9	131	29	0	Goats	Ghana	285	12.3	3	0	0	3	0			Ye et al. (2015)
Cattle	US	819	33.5	274	10	0	Goats	Greece	255	40.4	30	1	0	26	Mixed A and E (n=3)		Zhang et al. (2012a)	
Cattle	Vietnam	412	13.8	25	0	0	Goats	India	207	33.8	28	10	9	8	D (1)		Wegayehu et al. (2017)	
Yaks	China	297	5.4	10	0	0	Goats	Iran	94	15.9	5	0	0	5	0			Squire et al. (2017)
Yaks	China	344	5.2	18	0	9	Goat- antelope (Chamois)	Italy	157	4.4	7	4	0	3	0			Tzanidakis et al. (2014)
Yaks	China	605	10.4	63	2	0	Goat	Malaysia	310	6.8	16	3	1	12	0			Utaaker et al. (2017)
Yaks	China	208	1.9	4	0	0	Goats	Tanzania	41	21.9	9	1	2	6	0			Jafari et al. (2014)
Yaks	China	545	6	16	0	0	Pigs	Nigeria	209	25.4	55	0	14	37	Mixed B and E (n=4)			De Liberato et al. (2015)
Sheep	Australia	3412	20.2	473	106	0	Pigs (wild boar)	China	357	3.1	11	2	0	9	0			Lim et al. (2013)
Sheep	Australia						Pigs	China	560	8.0	45	9	0	36	0			Di Cristanziano et al. (2014)
Sheep	Brazil	100	34	34	0	0	Pigs	Denmark	856	14.0	13	2	0	11	0			Akinkuotu et al. (2019)
Sheep	Brazil	105	24.8	14	0	0	Pigs	Poland	84	29.8	5	0	1	4	0			Li et al. (2017a)
Tibetan Sheep	China	177	1.7	3	0	0	Pigs (feral)	US	370	4.3	16	6	0	10	0			Wang et al. (2017b)
																		Petersen et al. (2015)
																		Stojecki et al. (2015a)
																		Rodriguez-Rivera et al. (2016)
																		Peng et al. (2016)

¿estamos considerando estos parásitos dentro del posible diagnóstico?  
¿los estamos buscando?  
¿estamos tomando muestras apropiadas?

## Trombocitopenia Cíclica Infecciosa Canina



V JORNADA DE DIFUSIÓN DE LA INVESTIGACIÓN Y EXTENSIÓN  
 Noviembre 2017 · Esperanza · Santa Fe · Argentina  
 ÁREA TEMÁTICA: **SALUD ANIMAL**

### Anaplasma platys en caninos: primer reporte para la provincia de Santa Fe (Argentina)

Ruiz, M.F.<sup>1</sup>; Vázquez, J.<sup>2,3</sup>; Zimmermann, R.N.<sup>1</sup>; Aguirre, F.O.<sup>1</sup>; von der Thüsen, S.<sup>1,4</sup>; González, A.D.<sup>1</sup>; Canal, A.<sup>3</sup>

DISPATCHES

### Anaplasma platys in Dogs, Chile

Katia Abarca,\* Javier López,†‡ Cecilia Perret,\*  
 Javier Guerrero,† Paula Godoy,\* Ana Veloz,\*  
 Fernando Valiente-Echeverría,\* Ursula León,\*  
 Constanza Gutjahr,† and Teresa Azócar\*  
 Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 13, No. 9, September 2007

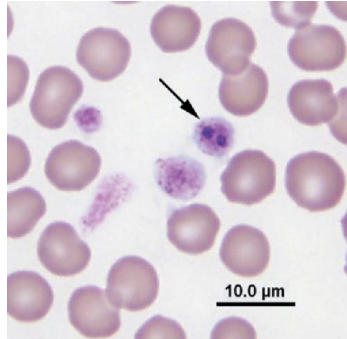


Molecular detection, characterization of *Anaplasma* spp. in domestic cats from Rio de Janeiro state

Andresa Guimarães<sup>a</sup>, Juliana Macedo Raimundo<sup>a</sup>, Maristela Peckle Peixoto<sup>b</sup>, Claudia Bezerra da Silva<sup>b</sup>, Marcus Sandes Pires<sup>b</sup>, Huarrisson Azevedo Santos<sup>c</sup>, Cristiane Divan Baldani<sup>a,\*</sup>



35 días después el recuento plaquetario era normal.

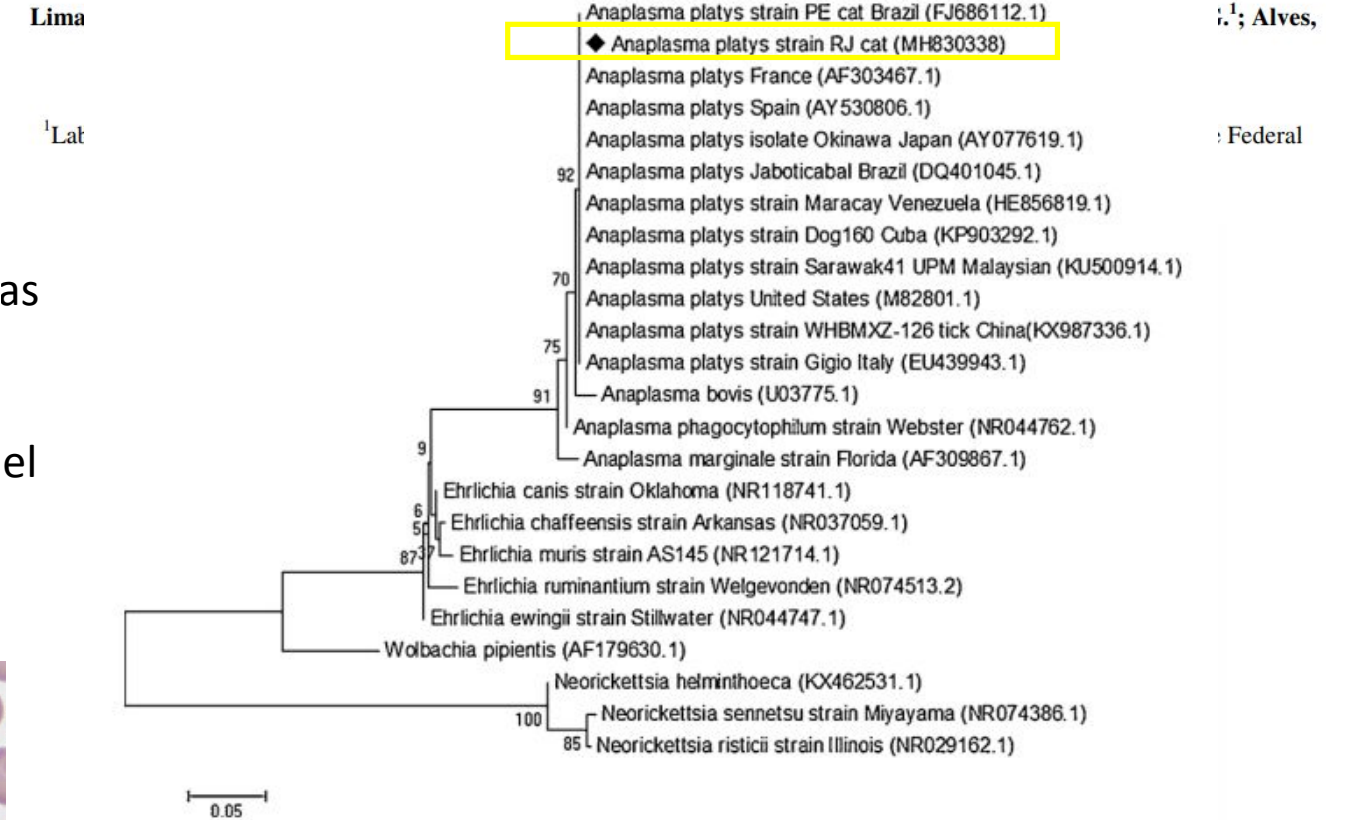


# Anaplasma platys

## Coexistencia perros y gatos

Brazilian Journal of Microbiology (2010) 41: 381-385  
ISSN 1517-8382

### MOLECULAR DETECTION OF ANAPLASMA PLATYS IN A NATURALLY-INFECTED CAT IN BRAZIL



**Fig. 1.** Phylogenetic position of *Anaplasma platys* isolates from Brazilian domestic cat from Rio de Janeiro, based on 16S rRNA sequences (678 bp). The tree was constructed using the neighbor-joining method and the numbers on the tree indicate bootstrap values for the branch points. Accession numbers and place of origin of the isolates are shown beside the sequence names. The numbers at the nodes indicate the percentage of 1000 bootstrap resamplings.

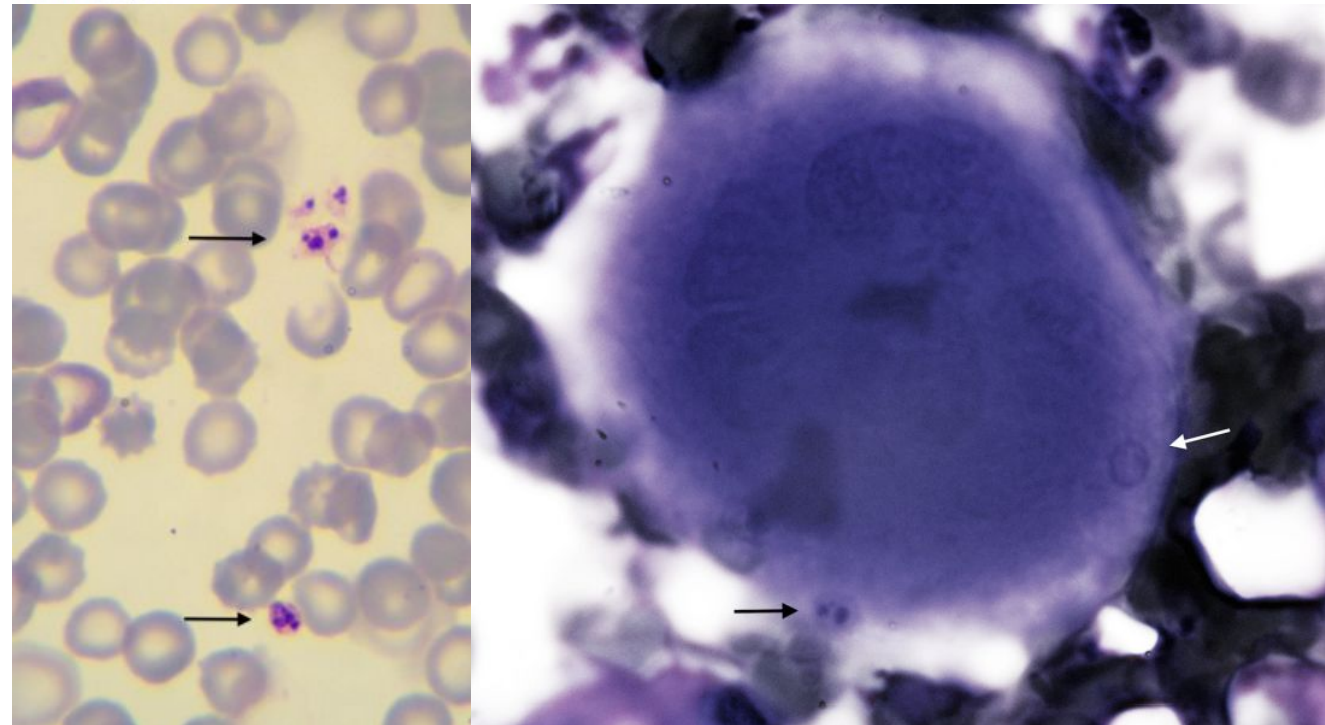
## *Anaplasma platys* in Bone Marrow Megakaryocytes of Young Dogs

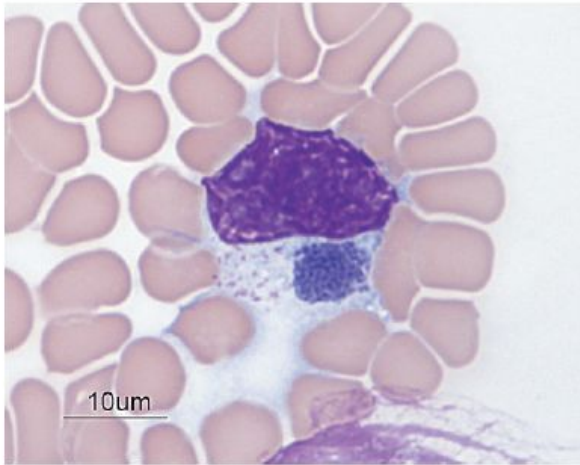
A. Sara De Tommasi,<sup>a</sup> Gad Baneth,<sup>b</sup> Edward B. Breitschwerdt,<sup>c</sup> Dorothee Stanneck,<sup>d</sup> Filipe Dantas-Torres,<sup>a,e</sup> Domenico Otranto,<sup>a</sup> Donato de Caprariis<sup>a</sup>

Department of Veterinary Medicine, University of Bari, Valenzano, Italy<sup>a</sup>; School of Veterinary Medicine, Hebrew University, Rehovot, Israel<sup>b</sup>; Intracellular Pathogens Research Laboratory, Center for Comparative Medicine and Translational Research, College of Veterinary Medicine, North Carolina State University, Raleigh, North Carolina, USA<sup>c</sup>; Bayer Animal Health GmbH, Leverkusen, Germany<sup>d</sup>; Departamento de Imunologia, Centro de Pesquisas Aggeu Magalhães (Fiocruz-PE), Recife, Pernambuco, Brazil<sup>e</sup>

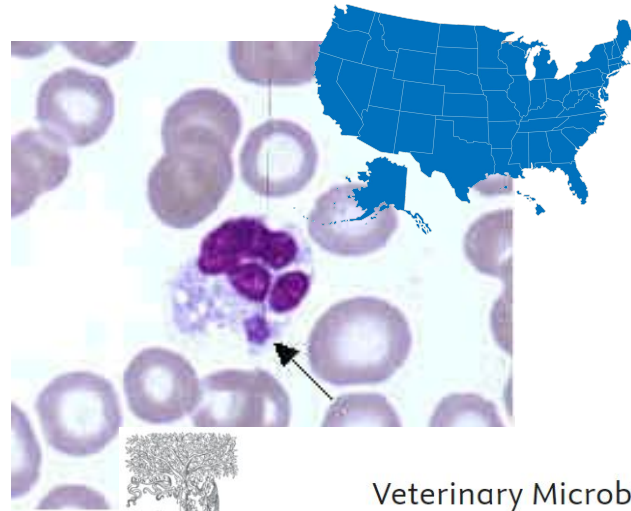


FIG 2 Promegakaryocytes with *Anaplasma platys* inclusions in a developing platelet (black arrow) and a platelet without inclusions (white arrow). Bone marrow, Diff-Quick stain (100 magnification).





**FIGURE 31.1** Blood film from a dog with *E. canis* infection. A morula is present in a disrupted large granular lymphocyte. The morula has the distinctive punctuate, granular appearance. Romanowsky stain.



**Veterinary Microbiology**  
 Volume 111, Issues 1–2, 30 November 2005, Pages 59–66



## Ehrlichial infection in Cameroonian canines by *Ehrlichia canis* and *Ehrlichia ewingii*

L.M. Ndip<sup>a</sup>, R.N. Ndip<sup>a</sup>, S.N. Esemu<sup>a</sup>, V.L. Dickmu<sup>a</sup>, E.B. Fokam<sup>a</sup>, D.H. Walker<sup>b,d</sup>, J.W. McBride<sup>b,c,d</sup> ✉



**Clinical Microbiology and Infection**  
 Volume 15, Supplement 2, December 2009, Pages 55–56



## First report of *Ehrlichia ewingii* detected by molecular investigation in dogs from Brazil

L.S. Oliveira<sup>a</sup>, K.A. Oliveira<sup>a</sup>, L.C. Mourão<sup>a</sup>, A.M. Pescatore<sup>b</sup>, M.R. Almeida<sup>c</sup>, L.G. Conceição<sup>d</sup>, M.A.M. Galvão<sup>e</sup>, C. Mafra<sup>a</sup> ✉



**Veterinary Parasitology: Regional Studies and Reports**

Volume 14, December 2018, Pages 117–122



Original Article

## Molecular and Serological Prevalence of *Anaplasma phagocytophilum*, *A. platys*, *Ehrlichia canis*, *E. chaffeenses*, *E. ewingii*, *Borrelia burgdorferi*, *Babesia canis*, *B. gibsoni* and *B. vogeli* among Clinically Healthy Outdoor Dogs in Serbia

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## A molecular and serologic survey of *Ehrlichia canis*, *E. chaffeensis*, and *E. ewingii* in dogs and ticks from Oklahoma

George L Murphy <sup>a</sup>, S.A Ewing <sup>b</sup>, Lisa C Whitworth <sup>a</sup>, J.Carl Fox <sup>b</sup>, A.Alan Kocan <sup>b</sup>

the presence of *Ehrlichia* DNA. Several groups of ticks were PCR-positive for *E. ewingii* or *E. canis*. *E. canis* was detected in *Rhipicephalus sanguineus*, which is considered the major vector for that organism. *E. ewingii* was detected in a larger variety of ticks, including the only known vector *Amblyomma americanum*, as well as in *Dermacentor variabilis* and *R. sanguineus*. Results

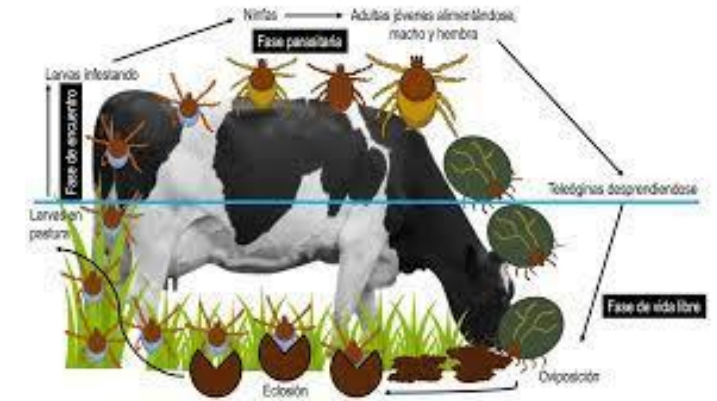
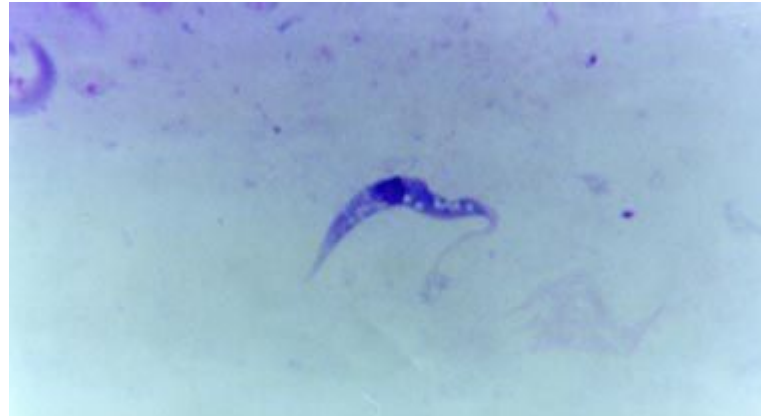
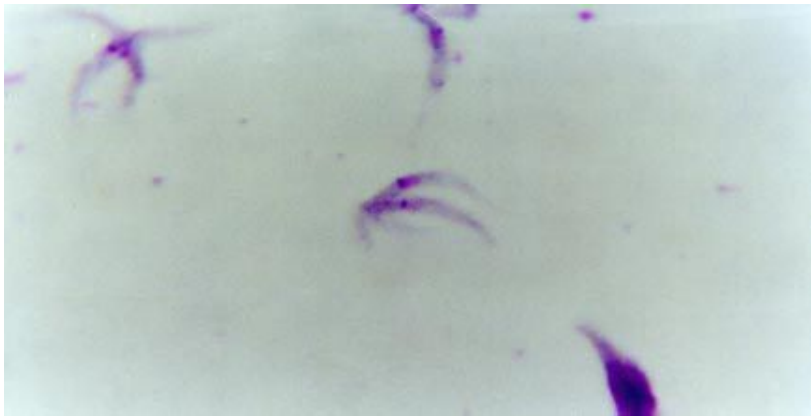


Rev Biomed 2003; 14:29-33.

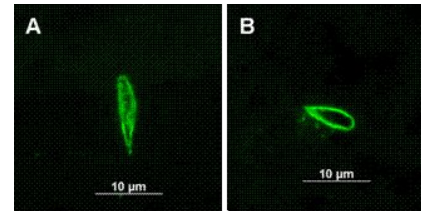
*Presencia del género Trypanosoma en la garrapata Boophilus microplus en el trópico mexicano.*

**Comunicación Breve**

Roger I. Rodríguez-Vivas<sup>1</sup>, Franklin Quiñones-Avila<sup>1</sup>, Geny T. Ramírez-Cruz<sup>1</sup>, Hugo Ruiz-Piña<sup>2</sup>.



¿Por qué no es vector?





**RESOLUCIÓN No.100164**  
**(07/07/2021)**

*“Por la cual se establecen los requisitos sanitarios para el ingreso y salida del país de perros y gatos como animales de compañía o con destino comercial y se dictan otras disposiciones”*

## IMPORTACIÓN DE PERROS Y GATOS

1. Certificado sanitario (vigencia de max. 10 días):

Características del animal

Evaluación clínica

Desparasitación (hasta 60 días antes)

Sin heridas

2. Certificado de vacunación vigente

\* Perros: Rabia, Distemper, hepatitis canina, leptospirosis, Parvovirus, Coronavirus, Parainfluenza.

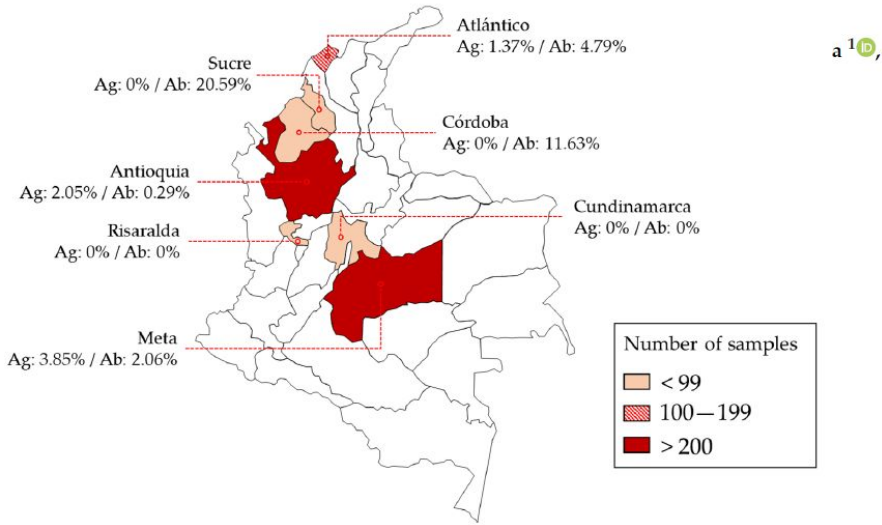
\* Gatos: Rabia, Panleucopenia felina, Rinotraqueítis viral felina y Calicivirus felino.



# ¿ES SUFICIENTE?



Communication  
**Nationwide Seroprevalence Survey of *Angiostrongylus vasorum*-Derived Antigens and Specific Antibodies in Dogs**



a 1<sup>o</sup>



*Gasterophilus* sp.

*Rabditis bovis*

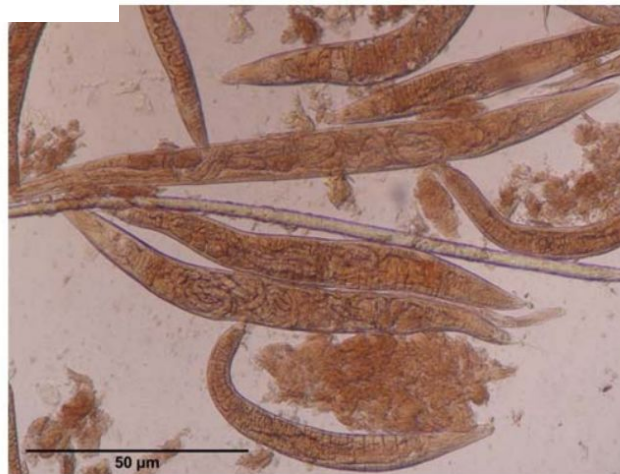


Figura 4. *Rhabditis bovis*, observado en el microscopio. Obsérvese la gran cantidad de hembras de *Rhabditis* gestantes con larvas en su interior. 10x. Fuente:



# Conclusiones

Debemos considerar lo enzoótico y lo exótico como un fenómeno dinámico.

Los parásitos están evolucionando más rápido:

Fenómenos de comercialización animal (importación – exportación).

Coincidencia ecológica de varias especies promueve atravesar la barrera de especie para un parásito.

Para un parásito atravesar la barrera de especie representa adaptaciones en el nuevo hospedero, lo cual puede significar ciclos de vida diferentes entre hospederos. Estos ciclos son importantes para el desarrollo de pruebas diagnósticas.

Estos fenómenos parasitológicos implican:

Comunicación permanente entre los profesionales de laboratorios y los investigadores.



# Gracias ...



**VI CONGRESO LATINOAMERICANO  
DE BIOQUIMICA CLÍNICA**

**II CONGRESO INTERNACIONAL DEL  
COLEGIO NACIONAL DE BACTERIOLOGÍA**

*¡El riesgo es que te quieras quedar!*

**Cartagena, Colombia 3 al 6 OCTUBRE 2024**

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