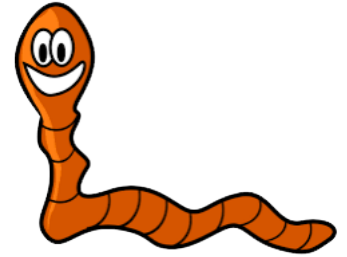


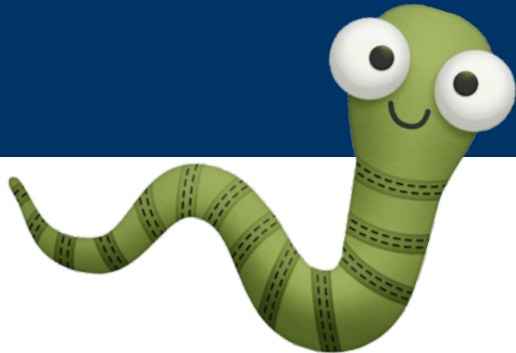


Instituto de Ciências Biomédicas
Universidade de São Paulo



Aula prática

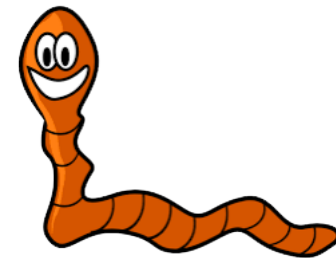
Nematoídes



Arthur Gruber



Nematódeos – classificação



Ordem

Superfamília

Bolsa copulatória

Strongylida

Trichostrongyloidea
Strongyloidea
Ancylostomatoidea
Metastrongyloidea

nematóides "bursados"

Ascaridida

Ascaridoidea

Oxyurida

Oxyuroidea

Rhabditida

Rhabditoidea

Spirurida

Spiruroidea
Thelazioidea
Filaroidea
Habronematoidea

nematóides "não bursados"

Enoplida

Trichuroidea
(Trichinelloidea)
Dioctophymatoidea

Sufixo

ida

oidea

idae

inae

Nível taxonômico

Ordem

Superfamília

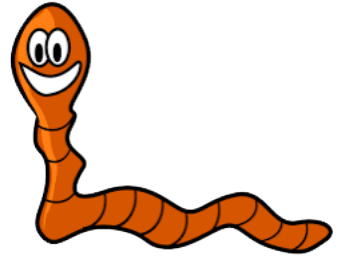
Família

Subfamília

Ascaridia galli – ovos



- Casca espessa e lisa
- Parede com 3 camadas
- Conteúdo não segmentado
- Comprimento: 68 μm - 90 μm
- Largura: 40 μm - 50 μm
- Formato levemente achatado



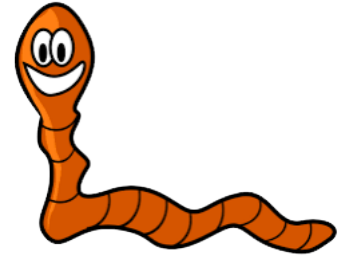
Ascaris suum – vermes adultos



Ascaris suum
Fêmea (esquerda) – 25-40 cm
Macho (direita) – 15-25 cm

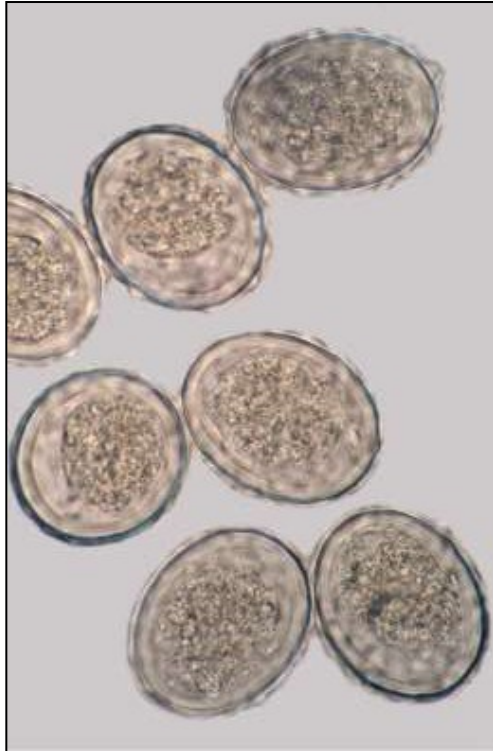


Ascaris suum
Intestino delgado de suíno

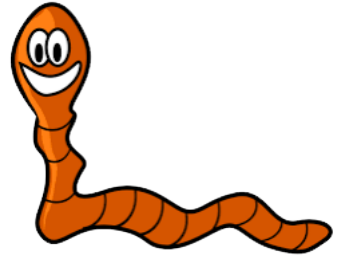


- Hospedeiro: **suínos**

Ascaris spp. – vermes adultos



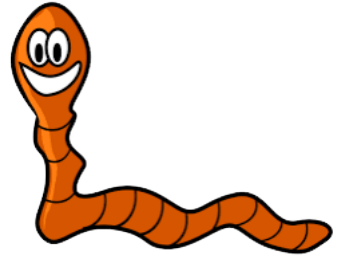
- Ovos de formato arredondado a ovalado
- Casca espessa
- Hospedeiro: **homem e mamíferos**



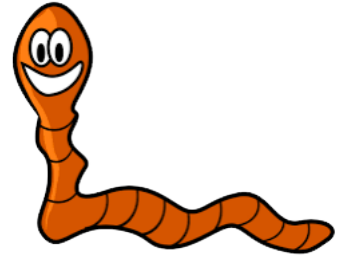
Toxocara spp. – ovos



- Ovos de formato circular
- Casca espessa e com rugosidades
- O embrião preenche praticamente todo o conteúdo do ovo
- Tamanho:
 - *T. canis* - 80 x 75 μm
 - *T. cati* - 75 x 65 μm



Toxocara canis – vermes adultos



Toxocara canis
Macho (acima) e fêmea (abaixo)

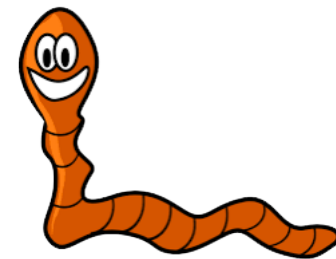


Toxocara canis
Intestino delgado de cão

Toxocara canis
Extremidade anterior – lábios trilobados



Nematódeos – classificação



Ordem	Superfamília	Bolsa copulatória
Strongylida	Trichostrongyloidea Strongyloidea Ancylostomatoidea Metastrongyloidea	nematóides "bursados"
Ascaridida	Ascaridoidea	
Oxyurida	Oxyuroidea	
Rhabditida	Rhabditoidea	
Spirurida	Spiruroidea Thelazioidea Filaroidea Habronematoidea	nematóides "não bursados"
Enoplida	Trichuroidea (Trichinelloidea) Dioctophymatoidea	

Sufixo

ida

oidea

idae

inae

Nível taxonômico

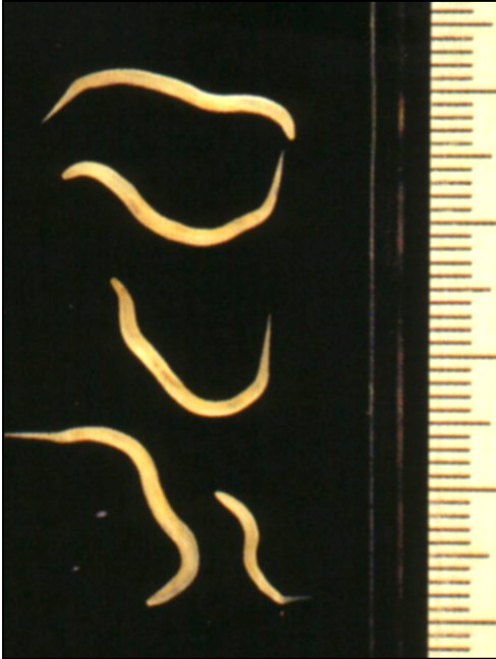
Ordem

Superfamília

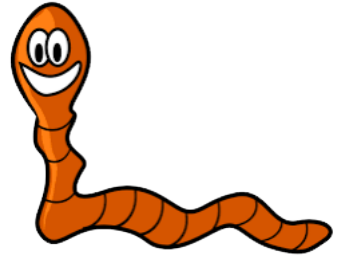
Família

Subfamília

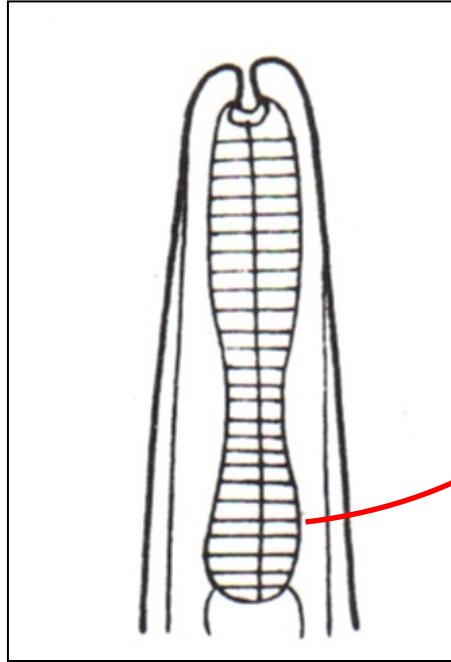
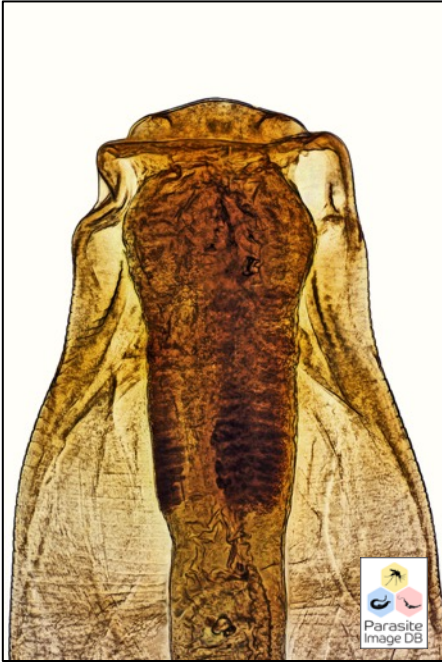
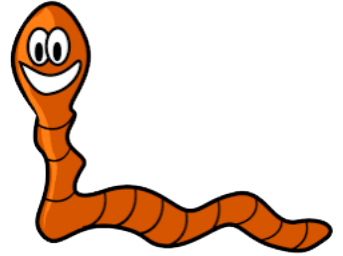
Oxyuris – vermes adultos



- Fêmeas adultas apresentam coloração branca de até 10 cm de comprimento, com cauda pontiaguda
- Machos são bem menores, medem de 9 a 12 mm de comprimento
- Hospedeiros: [animais mamíferos](#)



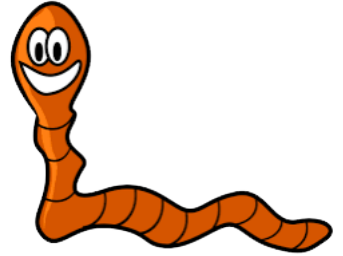
Oxyuris – vermes adultos



Bulbo esofageano

- Esôfago do tipo oxiuróide com bulbo esofageano posterior.
- Hospedeiros: **eqüinos e asininos**

Oxyuris equi – fêmea – extremidade posterior

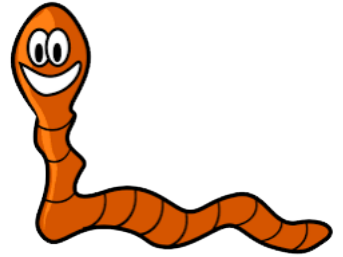


- Cauda pontiaguda
- Grande quantidade de ovos no interior do útero.
- Vulva se localiza na região anterior, mas não na região do esôfago

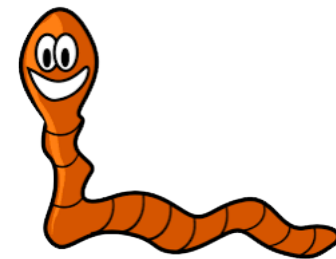
Oxyuris – ovo



- Morfologia ovóide, cor amarelada, levemente achatado em um dos lados
- Apresenta um opérculo, com um tampão mucóide em uma extremidade



Nematódeos – classificação



Ordem	Superfamília	Bolsa copulatória
Strongylida	Trichostrongyloidea	nematóides "bursados"
	Strongyloidea	
	Ancylostomatoidea	
	Metastrongyloidea	
Ascaridida	Ascaridoidea	nematóides "não bursados"
Oxyurida	Oxyuroidea	
Rhabditida	Rhabditoidea	
Spirurida	Spiruroidea	
	Thelazioidea	
	Filaroidea	
	Habronematoidea	
Enoplida	Trichuroidea	
	(Trichinelloidea)	
	Dioctophymatoidea	

Sufixo

ida

oidea

idae

inae

Nível taxonômico

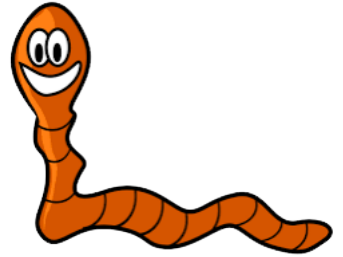
Ordem

Superfamília

Família

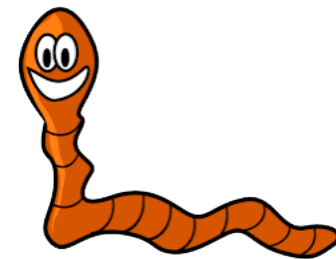
Subfamília

Strongyloides spp. – ovos



- Os ovos são menos freqüentes nas fezes do que as larvas
- Formato oval com casca fina
- Presença de larva no interior

Nematódeos – classificação



Ordem

Superfamília

Bolsa copulatória

Strongylida

Trichostrongyloidea
Strongyloidea
Ancylostomatoidea
Metastrongyloidea

nematóides "bursados"

Ascaridida

Ascaridoidea

Oxyurida

Oxyuroidea

Rhabditida

Rhabditoidea

Spirurida

Spiruroidea
Thelazioidea
Filaroidea
Habronematoidea

nematóides "não bursados"

Enoplida

Trichuroidea
(Trichinelloidea)
Dioctophymatoidea

Sufixo

ida

oidea

idae

inae

Nível taxonômico

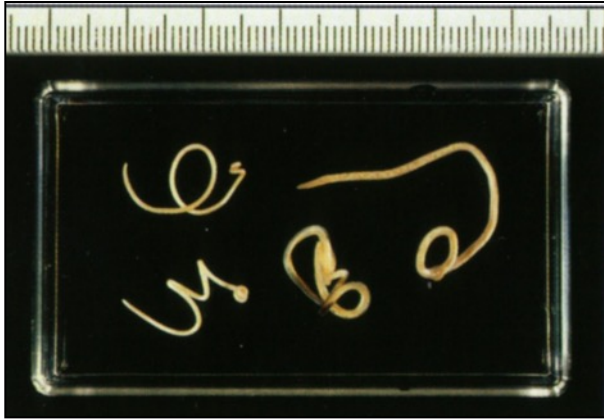
Ordem

Superfamília

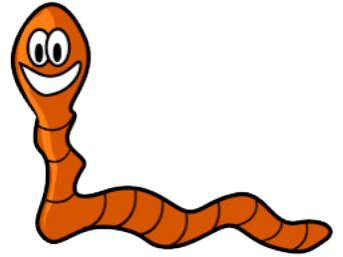
Família

Subfamília

Spirocerca lupi – formas adultas



- Medem até 8 cm de comprimento
- Têm coloração rósea, permanecem enovelados no interior dos granulomas
- Hospedeiro: **cão**, ocasionalmente gato

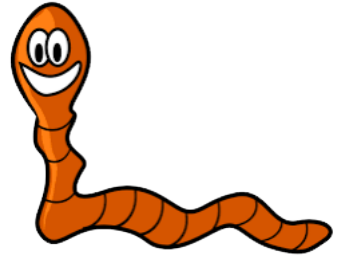


Peça: *Spirocerca lupi* em esôfago de cão

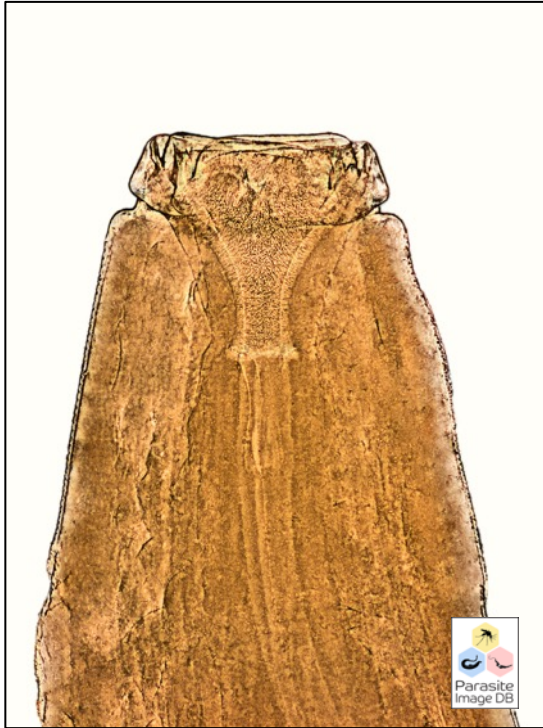
Spirocerca lupi – ovo



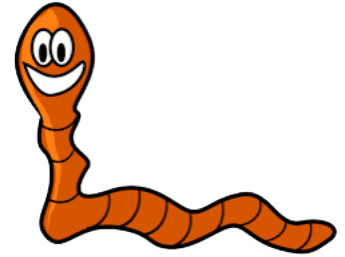
- Ovos pequenos (40 x 15 μm)
- Morfologia alongada, casca espessa, com lados paralelos, contém uma larva dobrada em forma de U



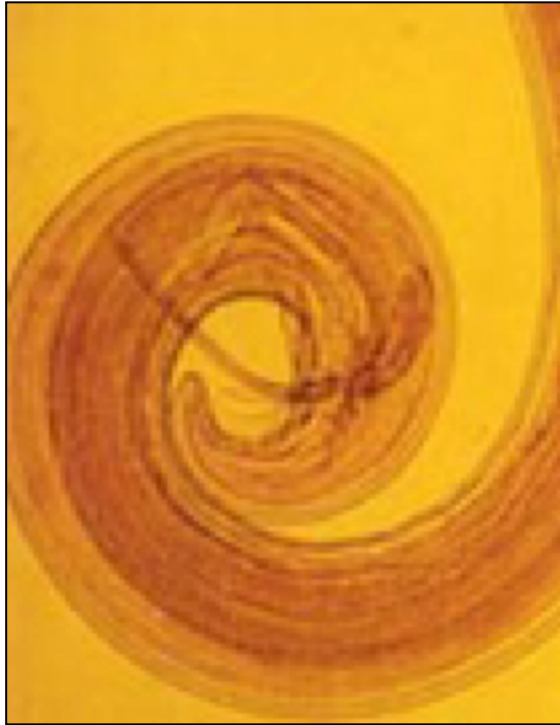
Habronema – adulto – extremidade anterior



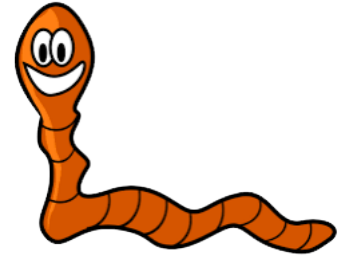
- Vermes brancos e finos com 1 a 2,5 cm de comprimento
- Hospedeiros: equinos e asininos



Habronema – adulto – extremidade posterior



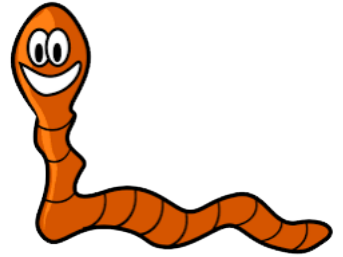
- Extremidade posterior espiralada
- Sem bolsa copulatória
- Presença de espículas



Habronema – ovo



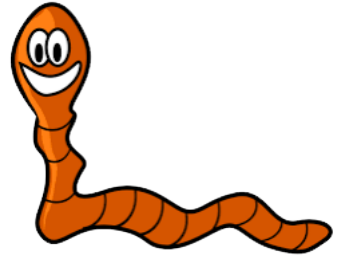
- Ovo alongado de casca fina
- Contém uma larva no seu interior



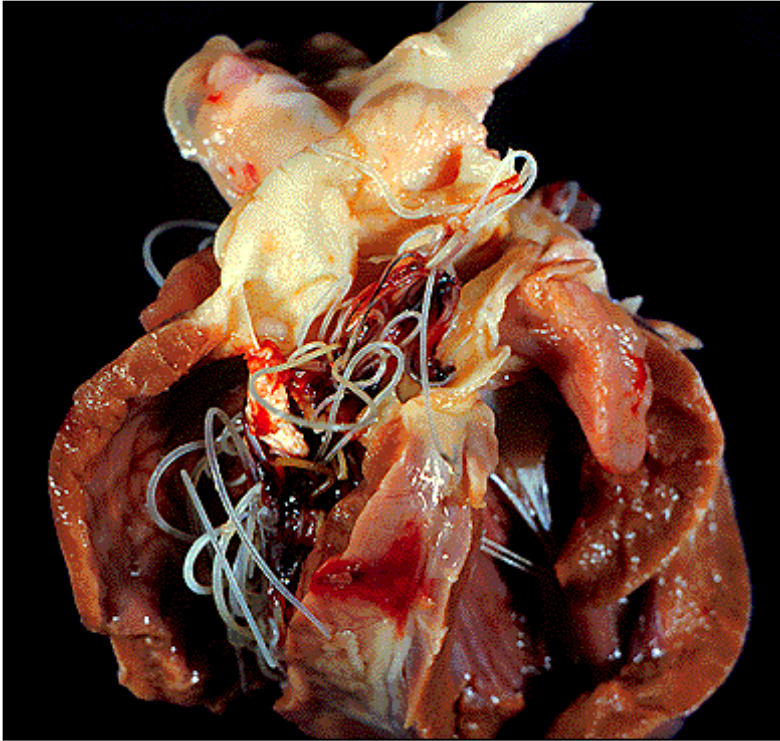
Dirofilaria immitis – formas adultas



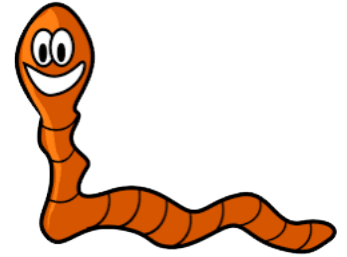
- Nematoides finos e longos, de coloração esbranquiçada
- Os machos medem de 12 a 20 cm de comprimento x 0,7 a 0,9 mm de diâmetro
- As fêmeas medem de 25 a 30 cm de comprimento x 1,0 a 1,3 mm de diâmetro
- Hospedeiros: **cão, gato, carnívoros silvestres, eqüinos, primatas, raramente o homem**



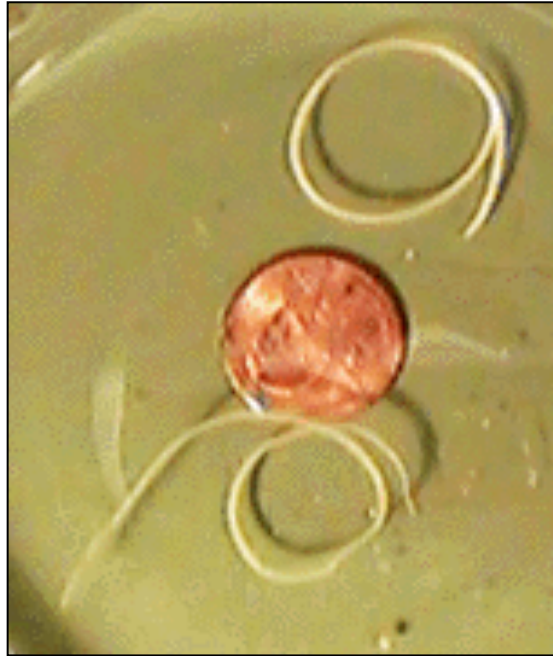
Dirofilaria immitis – formas adultas



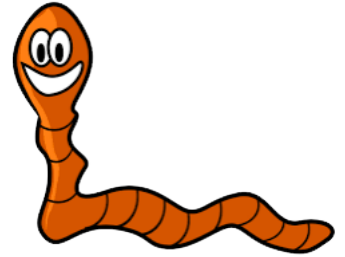
Vermes adultos em coração de cão



Setaria – formas adultas

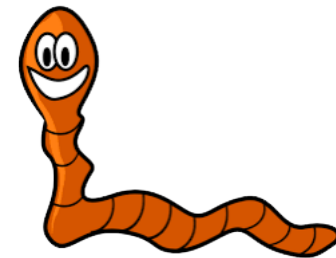


- Vermes delgados e longos, de até 12 cm de comprimento
- Hospedeiros: [eqüinos](#), [asininos](#), [ruminantes](#)



Extremidade anterior

Nematódeos – classificação



Ordem

Superfamília

Bolsa copulatória

Strongylida

Trichostrongyloidea
Strongyloidea
Ancylostomatoidea
Metastrongyloidea

nematóides "bursados"

Ascaridida

Ascaridoidea

Oxyurida

Oxyuroidea

Rhabditida

Rhabditoidea

Spirurida

Spiruroidea
Thelazioidea
Filaroidea
Habronematoidea

nematóides "não bursados"

Enoplida

Trichuroidea
(Trichinelloidea)
Dioctophymatoidea

Sufixo

ida

oidea

idae

inae

Nível taxonômico

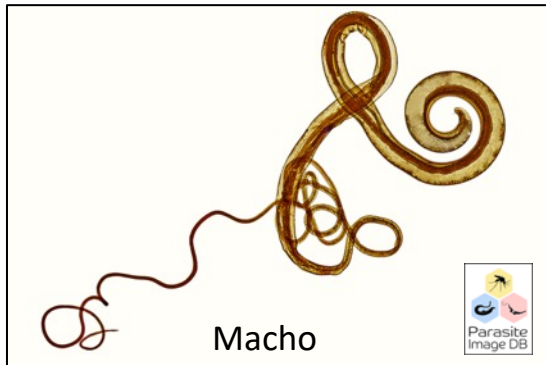
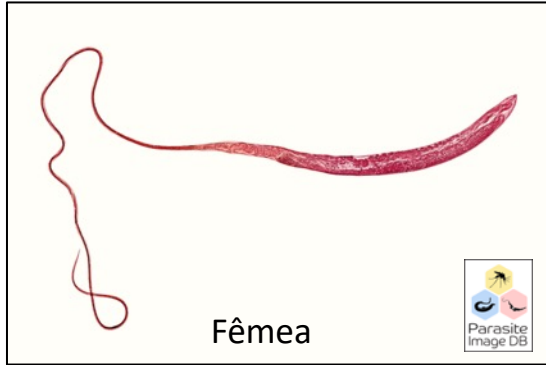
Ordem

Superfamília

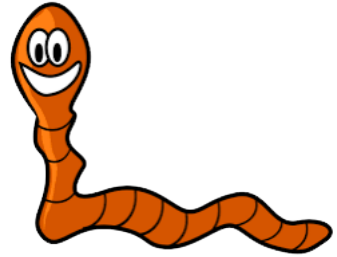
Família

Subfamília

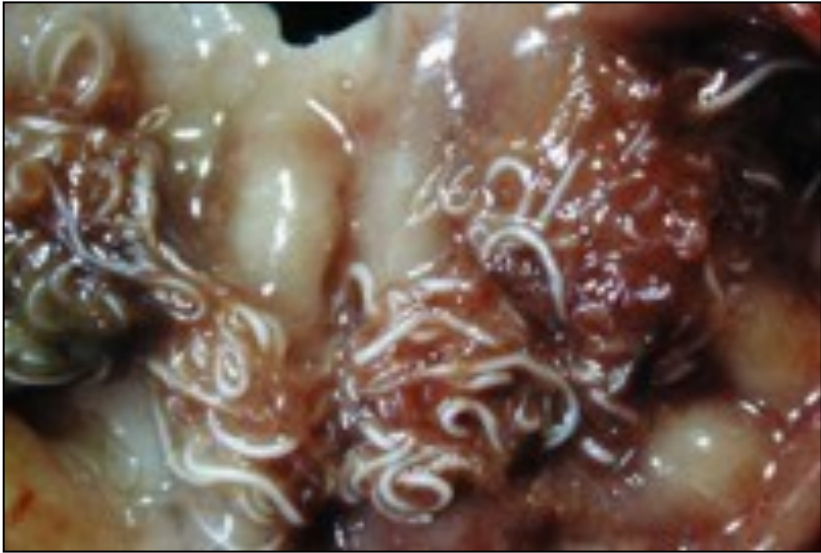
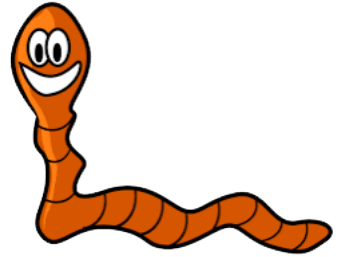
Trichuris spp. – vermes adultos



- Conhecidos como vermes “chicote”
- Medem de 3,6 a 8 cm
- Parasitam o ceco dos animais
- Permanecem com a parte anterior embebida na mucosa
- Hospedeiros: **ovinos**, **caprinos**, **bovinos**, **suínos**, **cães**



Trichuris spp. – vermes adultos

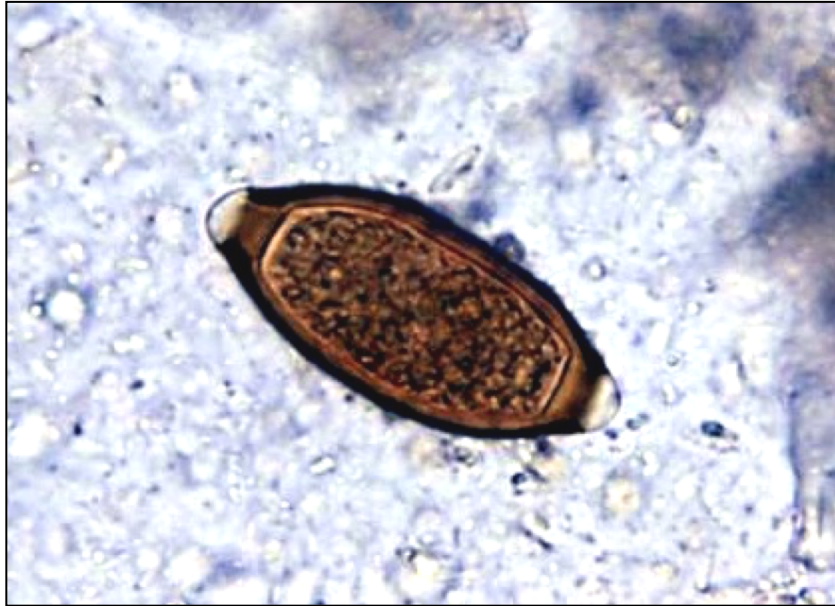
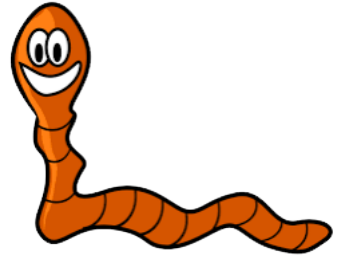


Intestino bovino



Adultos machos e fêmeas

Trichuris spp. – ovos



- Ovo bioperculado e não embrionado
- Superfície lisa

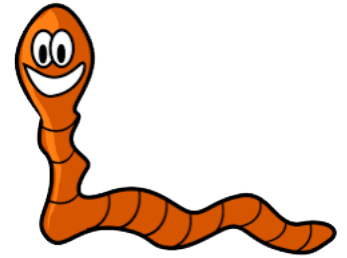
Dioctophyma renale – verme adulto



Adulto preenchendo a pelve renal

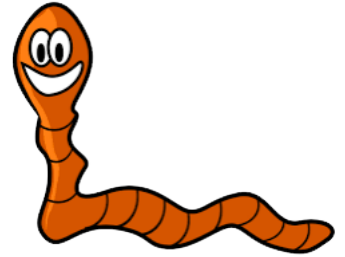
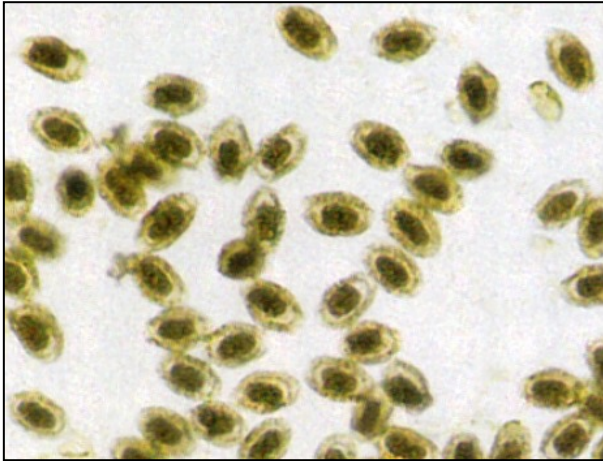


Verme adulto: 18,8 x 0,41 cm



- Hospedeiros: cães

Dioctophyma renale – ovos



- Os ovos são encontrados na urina
- Apresentam formato de barril, casca espessa
- Não apresentam conteúdo segmentado
- Tamanho: 65 x 42 μm

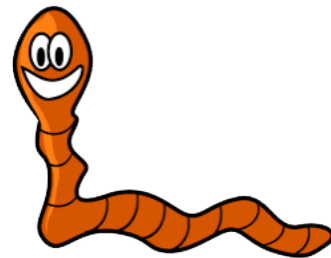
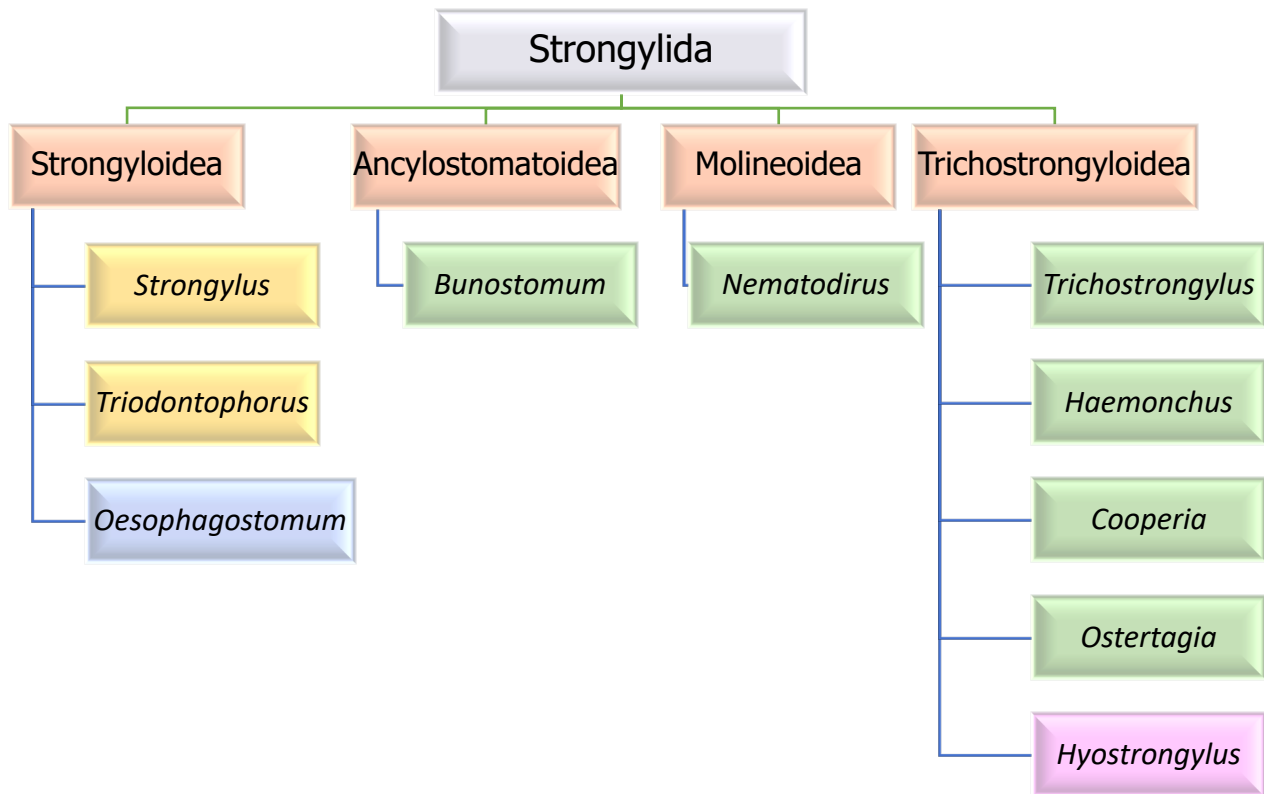
Nematódeos – classificação



Ordem	Superfamília	Bolsa copulatória	Sufixo	Nível taxonômico
Strongylida	Trichostrongyloidea	nematóides "bursados"	<i>ida</i> <i>oidea</i> <i>idae</i> <i>inae</i>	Ordem
	Strongyloidea			
	Ancylostomatoidea			
	Metastrongyloidea			
Ascaridida	Ascaridoidea	nematóides "não bursados"	<i>ida</i> <i>oidea</i> <i>idae</i> <i>inae</i>	Ordem
Oxyurida	Oxyuroidea			
Rhabditida	Rhabditoidea			
Spirurida	Spiruroidea			
	Thelazioidea			
	Filaroidea			
	Habronematoidea			
Enoplida	Trichuroidea			
	(Trichinelloidea)			
	Dioctophymatoidea			

Estrongilídeos do trato digestório

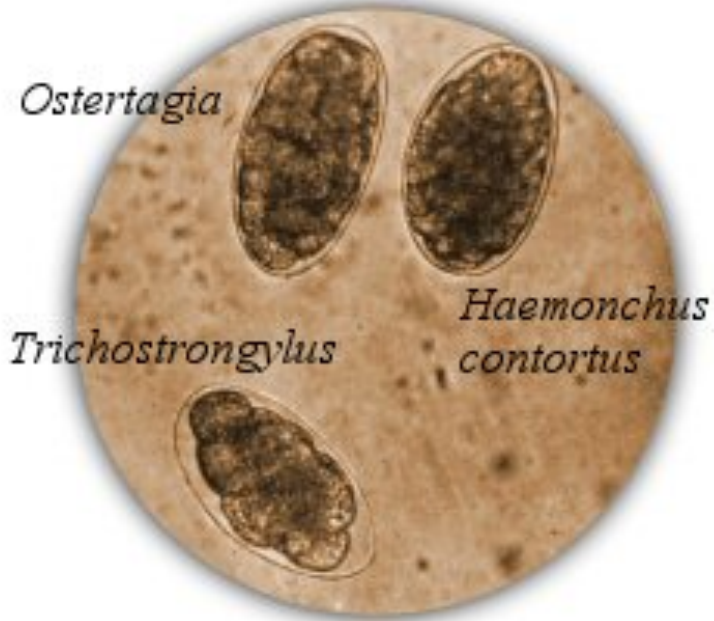
Ordem Strongylida – classificação



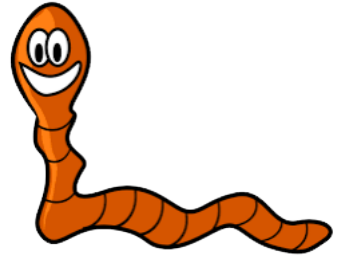
Hospedeiros:

- Ruminantes
- Equinos
- Suínos

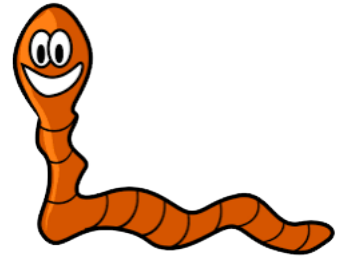
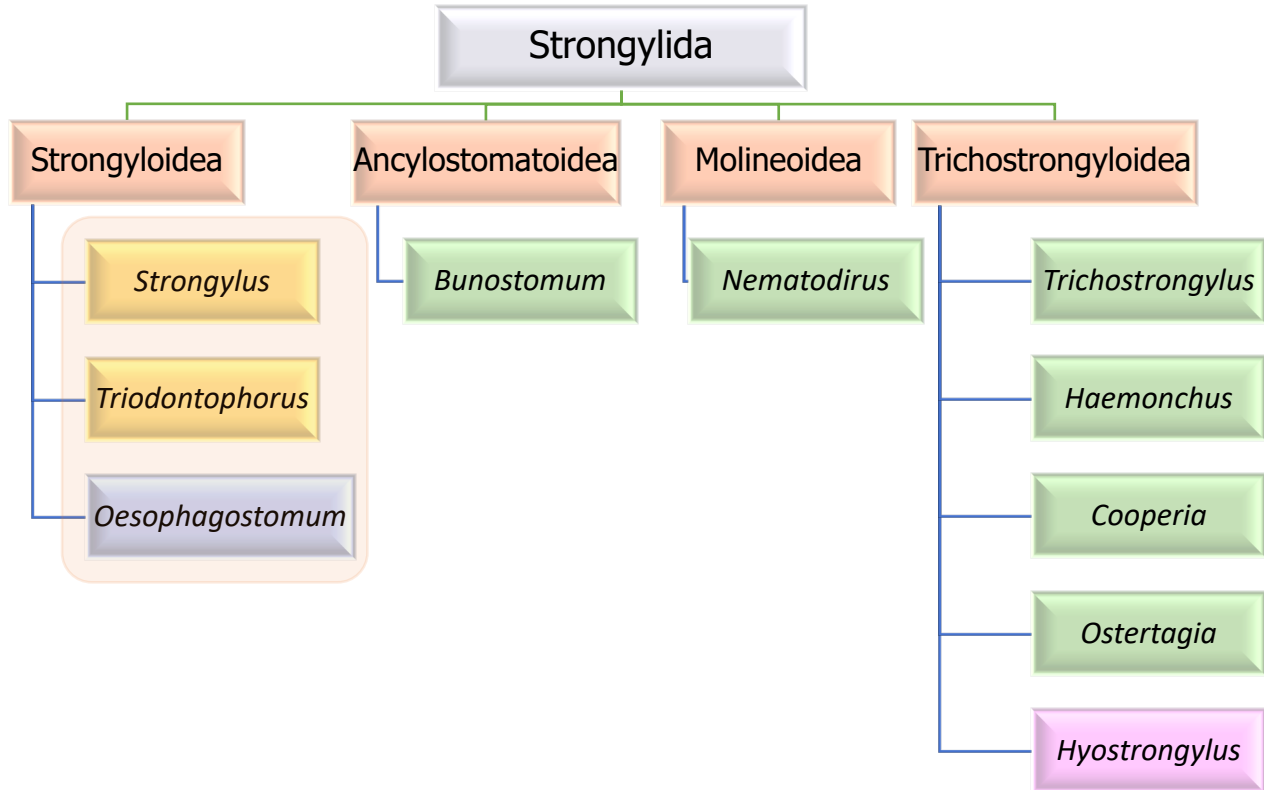
Estrongilídeos – ovos



- Os ovos recém-eliminados apresentam casca delgada
- Conteúdo segmentado contendo 8 a 16 blastômeros
- A identificação genérica dos estrongilídeos a partir dos ovos é praticamente impossível
- Cultura de fezes – morfologia das larvas
- Hospedeiros: ruminantes, eqüinos, suínos



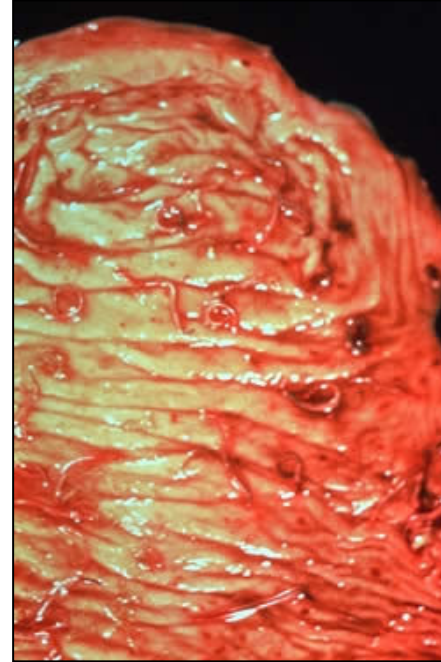
Ordem Strongylida – classificação



Hospedeiros:

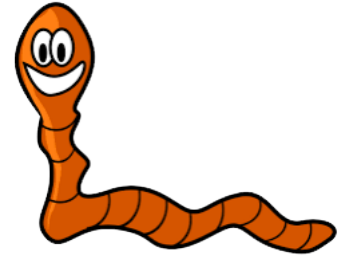
- Ruminantes
- Equinos
- Suínos

Strongylus vulgaris – formas adultas



- Vermes de coloração vermelho-escuro
- São robustos
- Medem de 1,5 a 2,5 cm de comprimento
- Hospedeiros: **eqüinos e asininos**

Peça: vermes em intestino grosso de eqüino



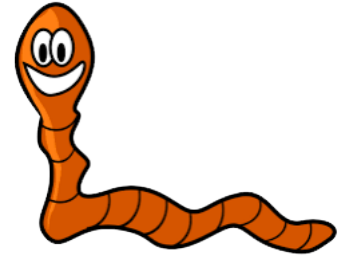
Triodontophorus – formas adultas



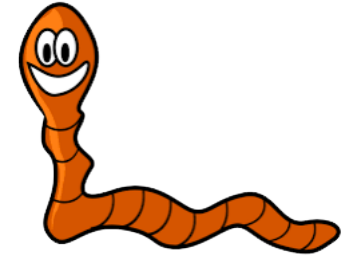
Medem de 1,0 a 2,5 cm de comprimento
Hospedeiros: eqüinos



Macho – extremidade posterior
Bolsa copulatória



Triodontophorus – adulto – extremidade anterior



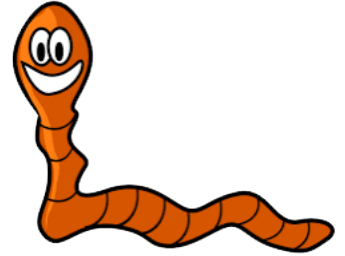
- Cápsula bucal bem desenvolvida, na base da qual se projetam três pares de dentes
- Hospedeiros: [eqüinos](#)

Oesophagostomum – formas adultas



Peça: nódulos em intestino delgado de bovino

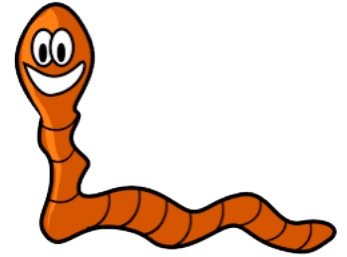
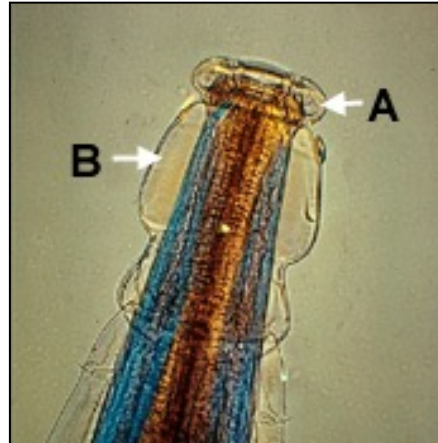
- Vermes brancos, com 1 a 2 cm de comprimento, de extremidade anterior afilada
- Hospedeiros: [ruminantes e suínos](#)



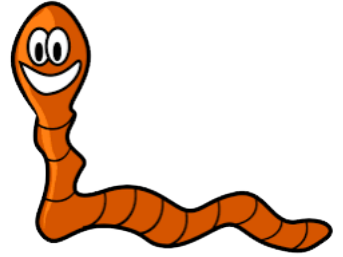
Oesophagostomum – formas adultas



- Cápsula bucal pequena, podendo estar rodeada por coroas lamelares
- A - Vesícula cefálica ao redor da cápsula bucal
- B - Vesícula cervical - logo abaixo da vesícula cefálica



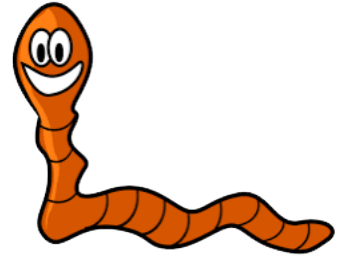
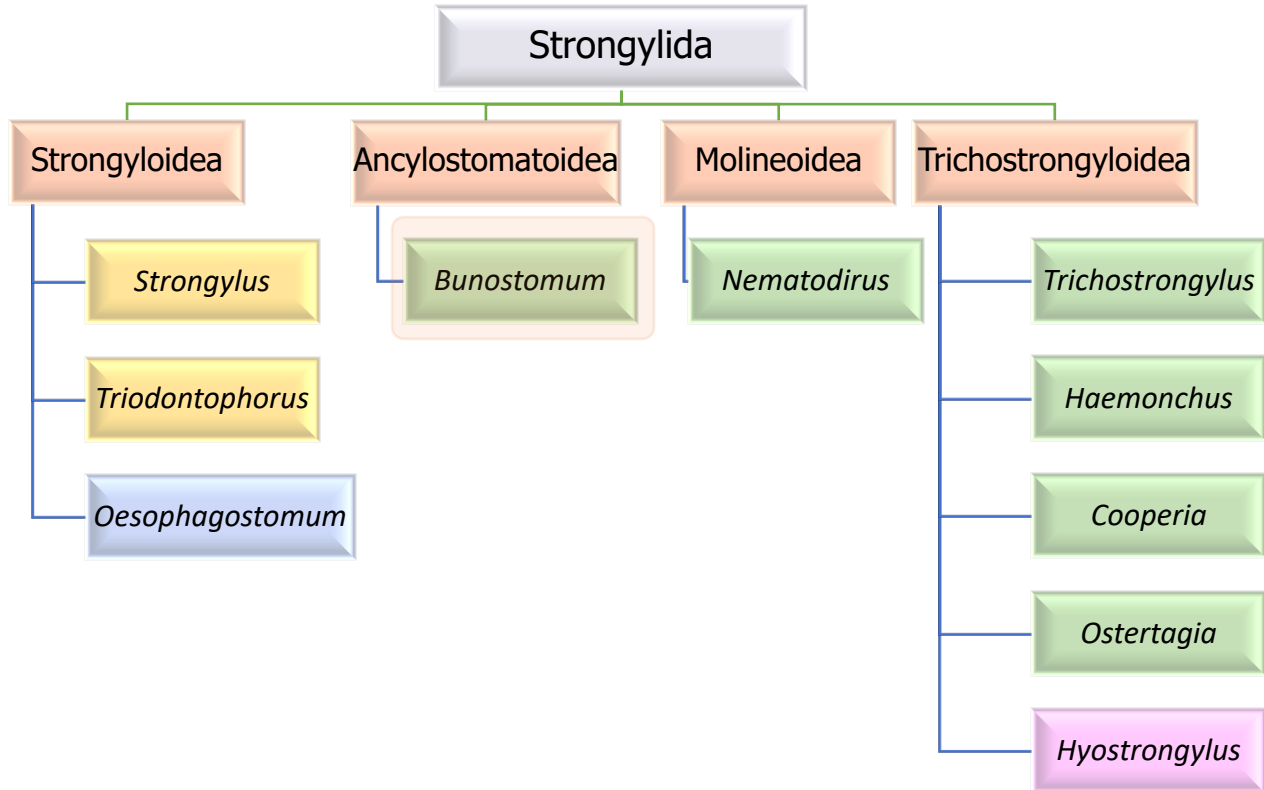
Oesophagostomum – extremidade posterior



Bolsa copulatória
Macho



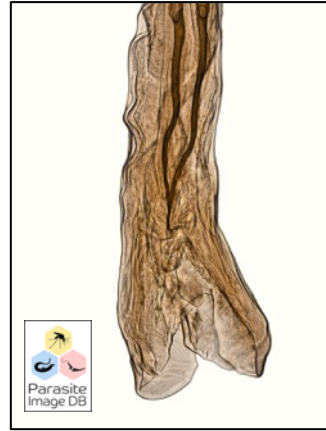
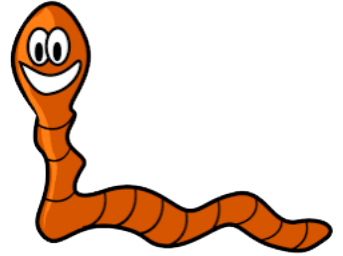
Ordem Strongylida – classificação



Hospedeiros:

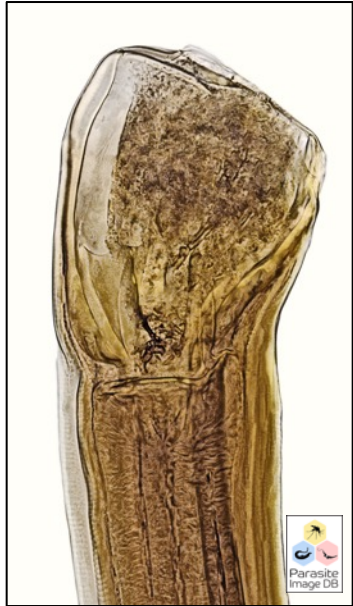
- Ruminantes
- Equinos
- Suínos

Bunostomum – formas adultas



- Mede de 1 a 3 cm de comprimento
- Extremidade anterior curva
- Há uma cápsula bucal com 2 lâminas cortantes na borda e um cone dorsal localizado internamente
- Considerado um dos maiores nematóides do intestino delgado de ruminantes
- Hospedeiros: [ruminantes](#)

Bunostomum – formas adultas



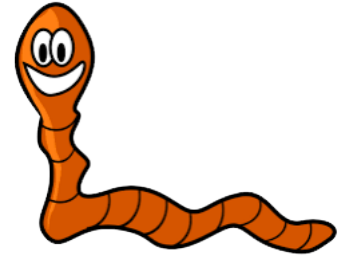
Extremidade anterior



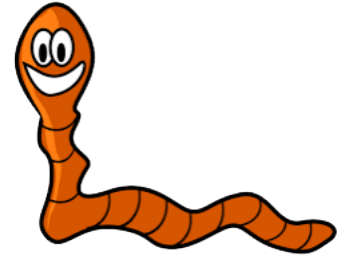
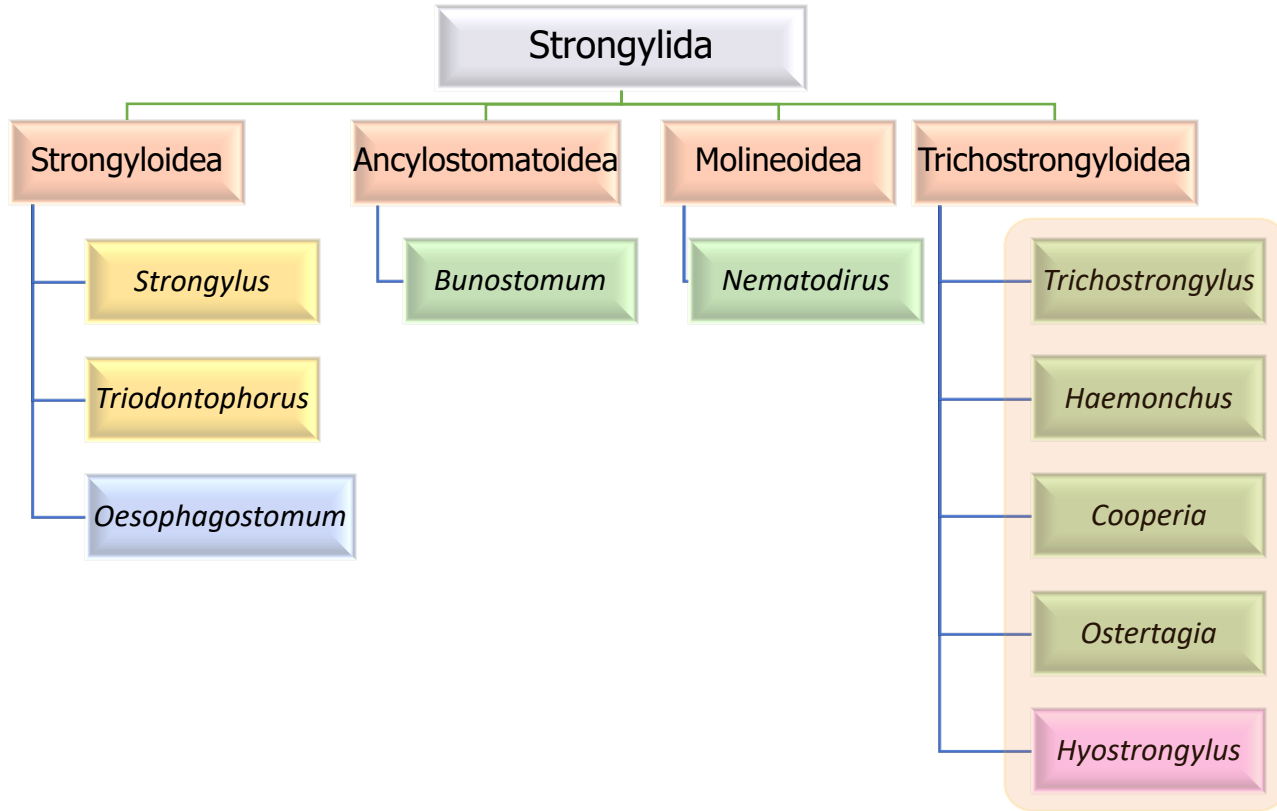
Extremidade posterior



Macho



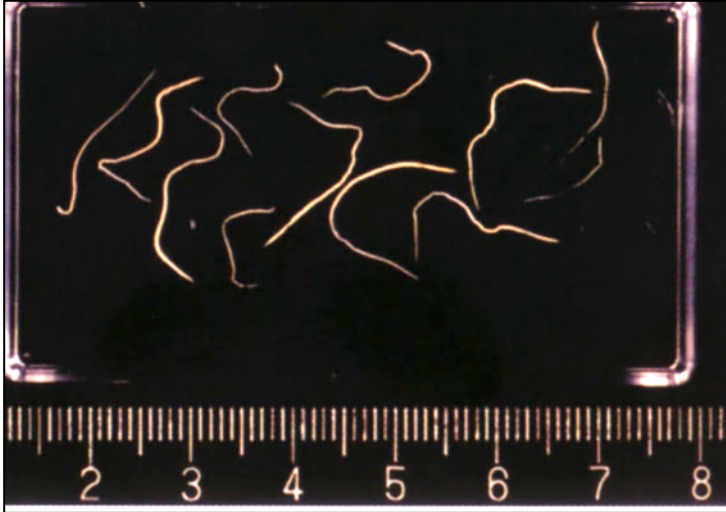
Ordem Strongylida – classificação



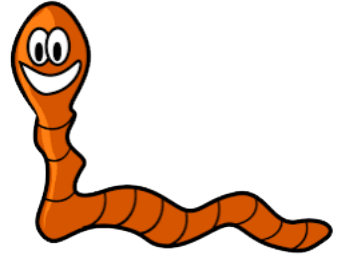
Hospedeiros:

- Ruminantes
- Equinos
- Suínos

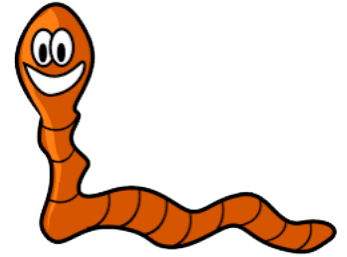
Haemonchus – formas adultas



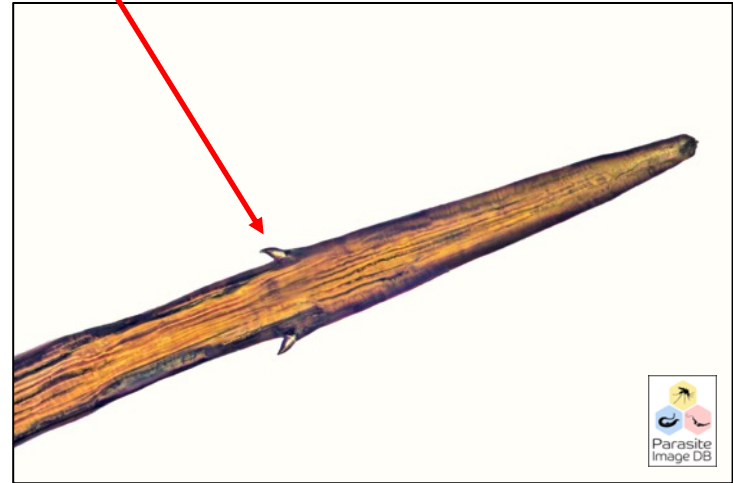
- Adultos têm 2 a 3 cm de comprimento
- Hospedeiros: **ruminantes**



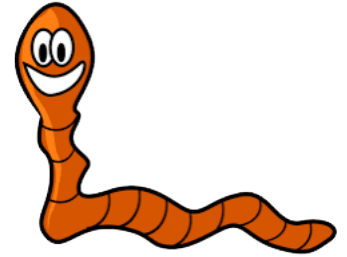
Haemonchus – adulto – extremidade anterior



Possuem papilas cervicais
proeminentes

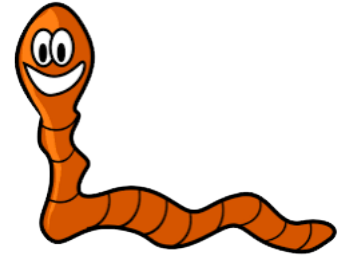


Haemonchus – adulto – extremidade anterior



- A fêmea possui um apêndice vulvar (seta) que protege a abertura da vulva
- Extremidade posterior afilada

Haemonchus – adulto – extremidade posterior

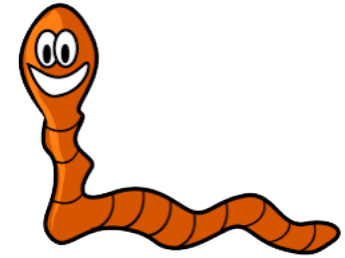
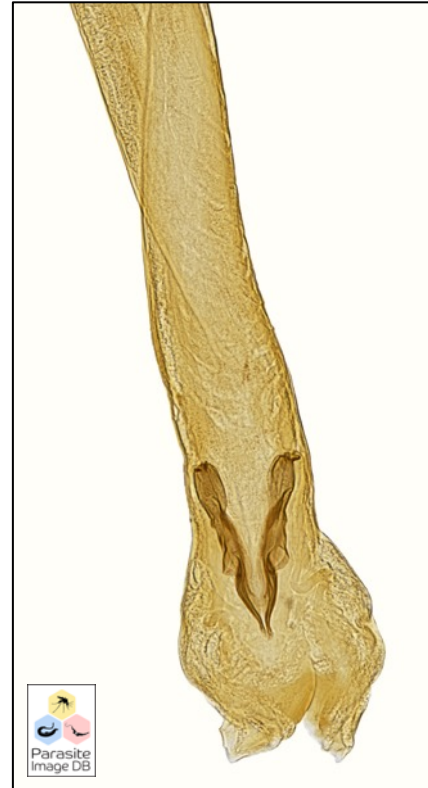


- Macho possui bolsa copuladora com lobo dorsal assimétrico

Cooperia – formas adultas



- Adultos - tamanho pequeno (até 1 cm de comprimento)
- Hospedeiros: **ruminantes**

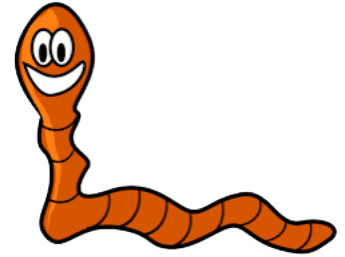
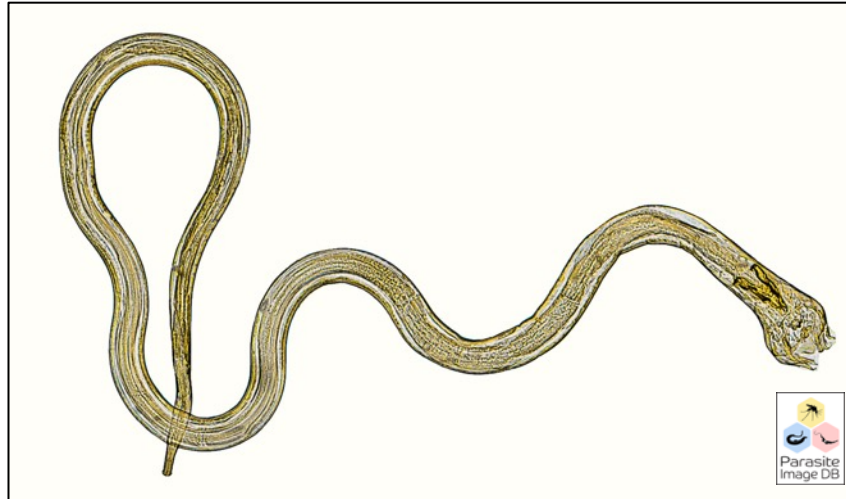


Extremidade posterior
Macho
Bolsa copulatória

Cooperia – formas adultas

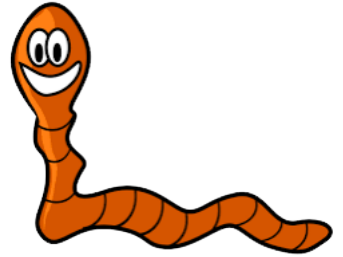


- Vesícula cefálica pequena
- Possuem estrias cuticulares transversais na região esofágica
- Hospedeiros: **ruminantes**



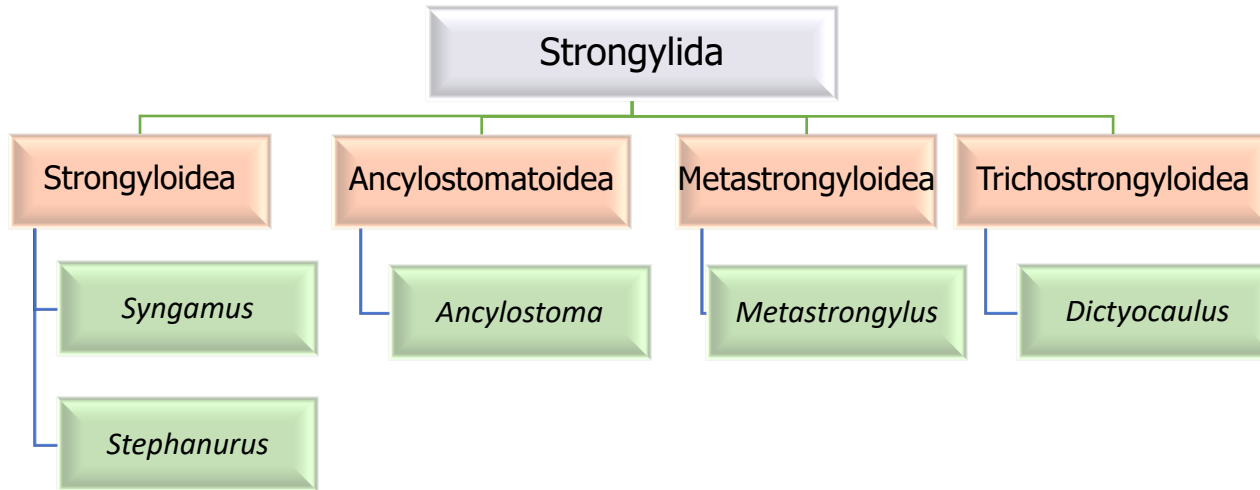
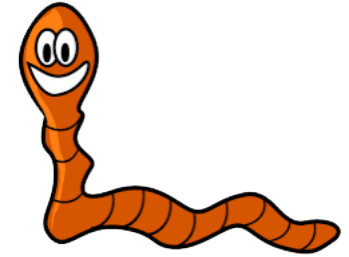
Cooperia – formas adultas

- Machos com bolsas copuladoras grandes
- Espículos possuem sulcos e uma dilatação na região média
- Não há gubernáculo

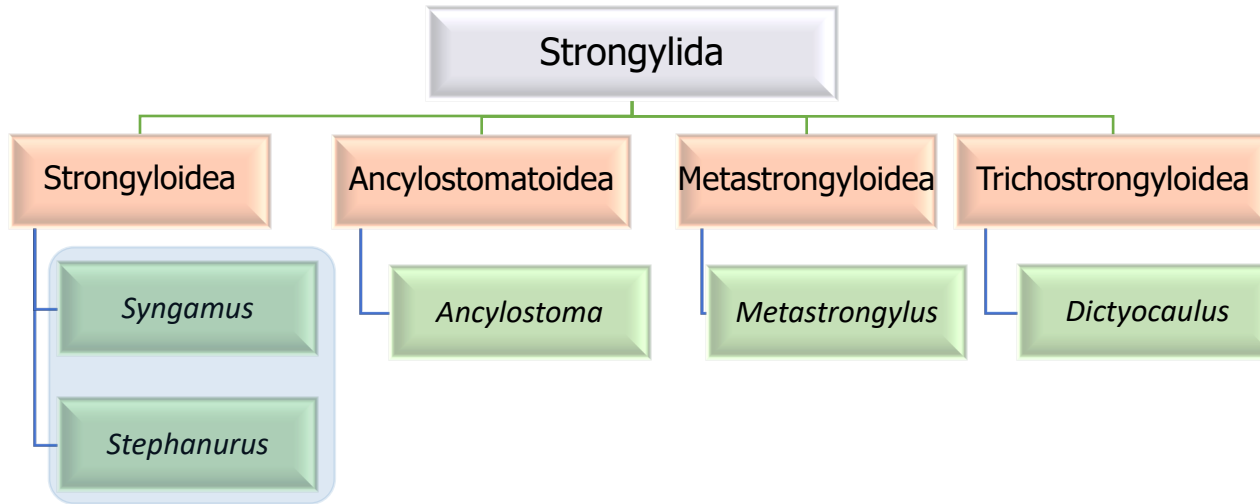
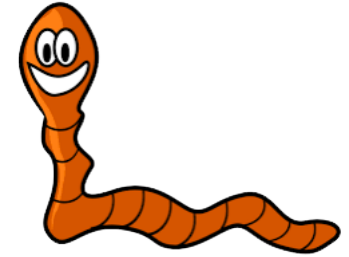


Estrongilídeos dos tratos respiratório e urinário

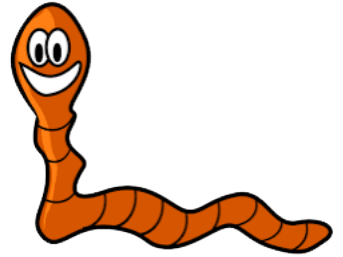
Ordem Strongylida – classificação



Ordem Strongylida – classificação

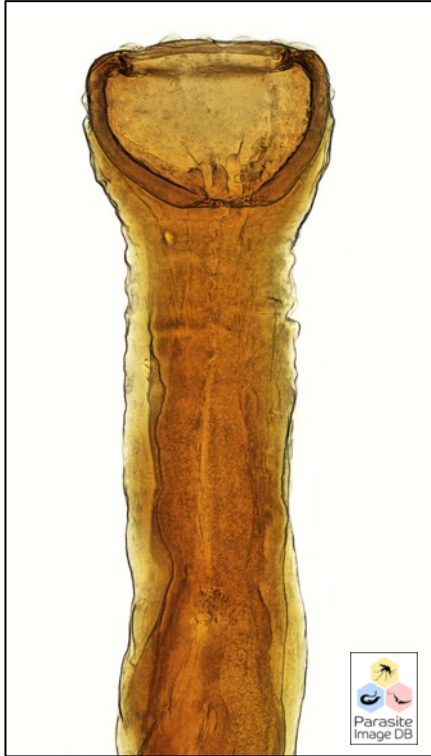


Syngamus trachea – formas adultas



- Ocorre na traquéia de perus, gansos, galinhas e aves silvestres
- Os adultos são encontrados em permanente cópula em forma de “Y”
- Machos: 2 a 6 mm
- Fêmeas: 5 a 20 mm

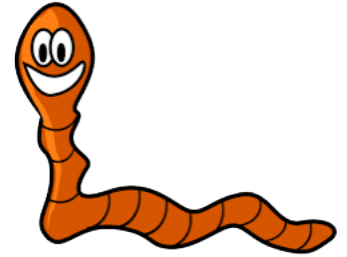
Syngamus trachea – formas adultas



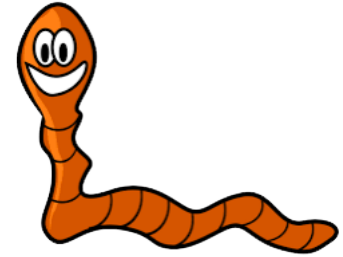
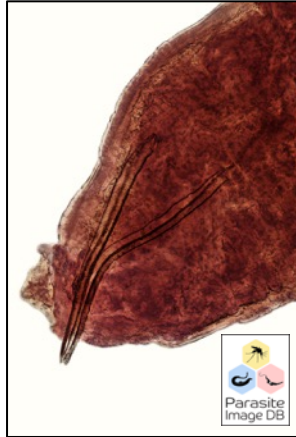
Extremidade anterior



Macho e fêmea em cópula

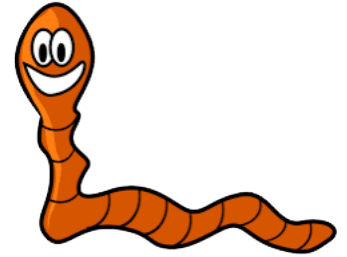
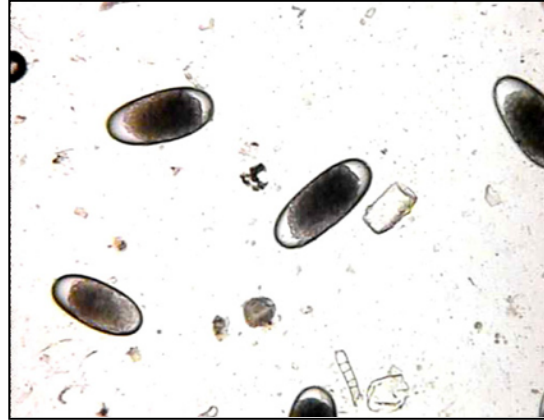


Stephanurus – formas adultas



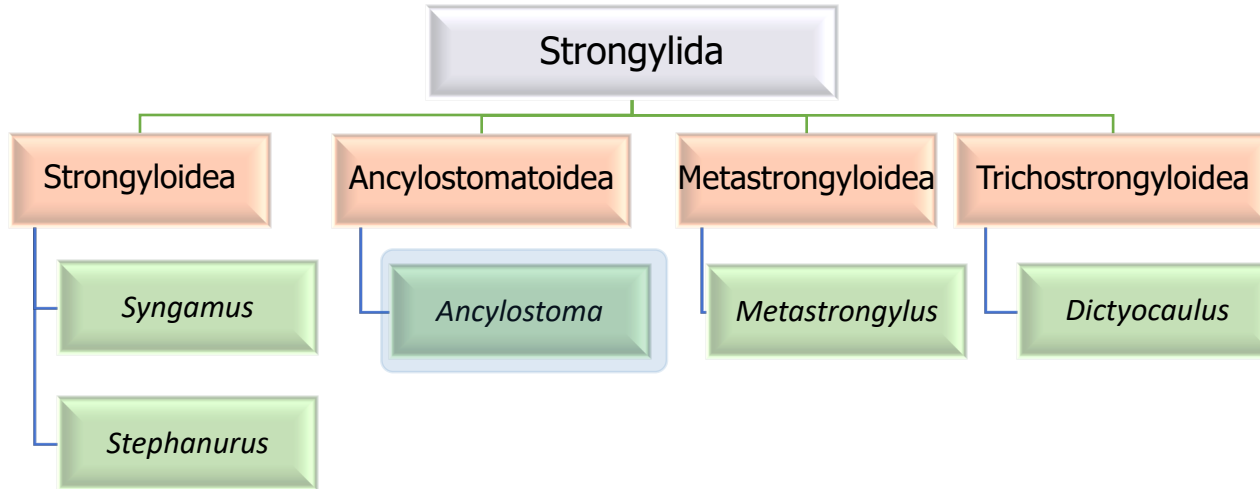
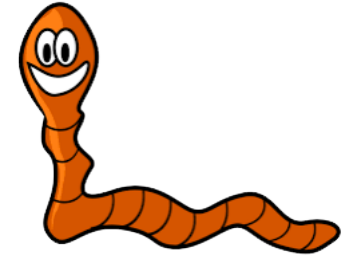
- Cápsula bucal em forma retangular, com 2 projeções cuticulares anteriores, com coroa franjeada e dentículos em sua base
- Esôfago claviforme e bem musculoso
- Bolsa copuladora com raios curtos e atrofiados e com 2 espículos de tamanho curto
- Hospedeiros: [suínos](#)

Stephanurus – ovos

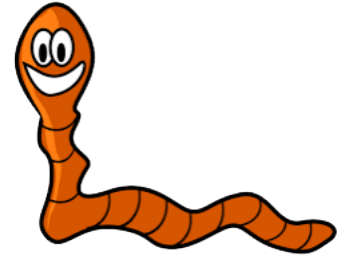


- Os ovos são encontrados na urina
- Tamanho: 100 x 60 μm

Ordem Strongylida – classificação



Ancylostoma – formas adultas



Tamanho (mm):

A. caninum – 11-13 (M), 10-18 (F)

A. tubaeformae – 9,5–11 (M), 12-15 (F)

A. duodenale – 8-11 (M), 10-18 (F)

Características:

Tamanho pequeno

Curvado dorsalmente

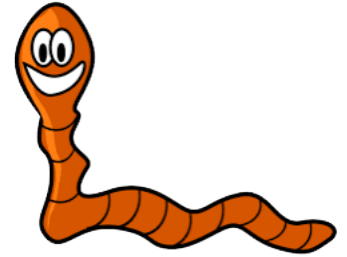
Vermes hematófagos

Hospedeiros: cães e gatos

Ancylostoma – adulto – extremidade anterior



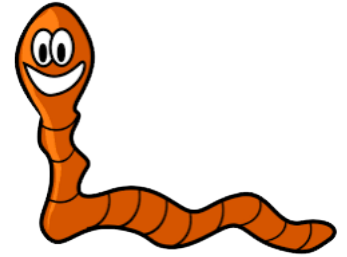
Cápsula bucal com 3 pares de dentes



Ancylostoma – macho – extremidade posterior



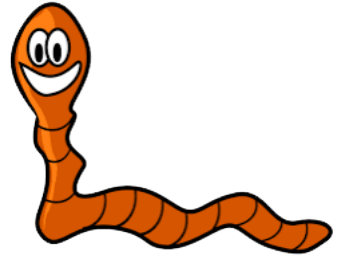
Bolsa copuladora com 2 espículos de tamanho médio



Ancylostoma – fêmea – extremidade posterior



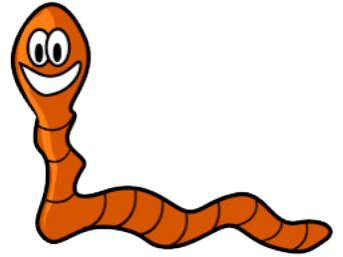
- Fêmeas com abertura vulvar no meio do corpo
- Extremidade posterior terminando de forma afilada



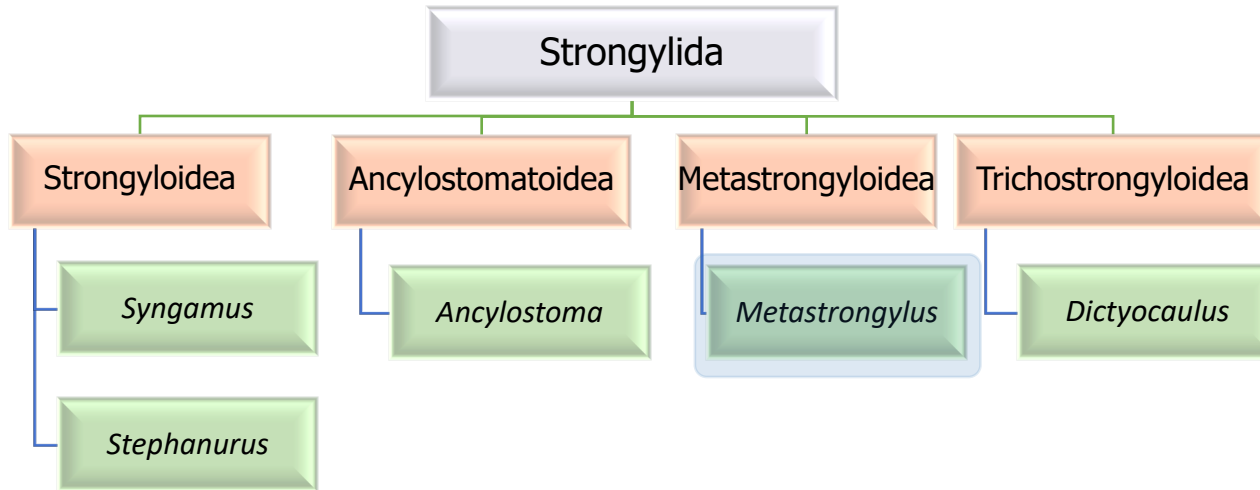
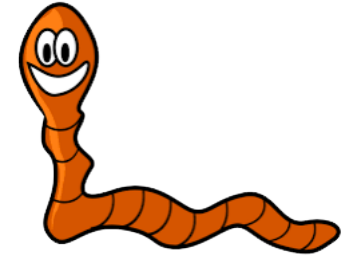
Ancylostoma – ovos



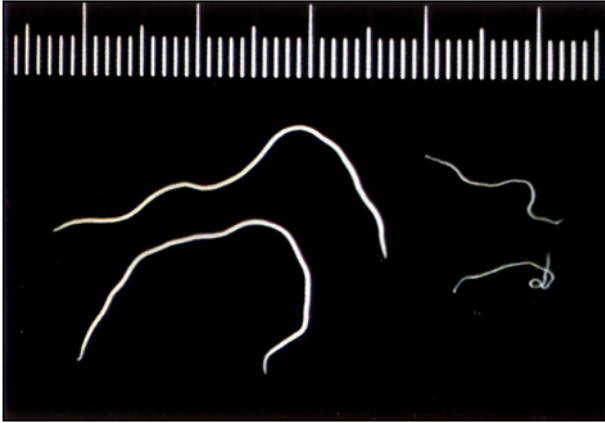
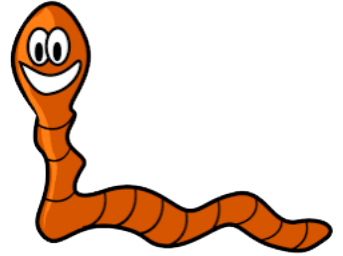
- Ovo de formato ovóide
- Casca fina
- Mórula (segmentado)
- Tamanho: 60 μm x 40 μm



Ordem Strongylida – classificação



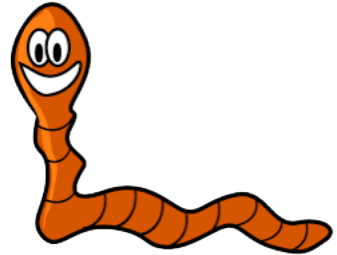
Metastrongylus spp. – formas adultas



Metastrongylus
Fêmeas (esquerda)
Machos (direita)

- Presença de dois lábios trilobados na extremidade anterior
- Longas espículas no macho
- Hospedeiros: [suínos](#)

Metastrongylus spp. – formas adultas

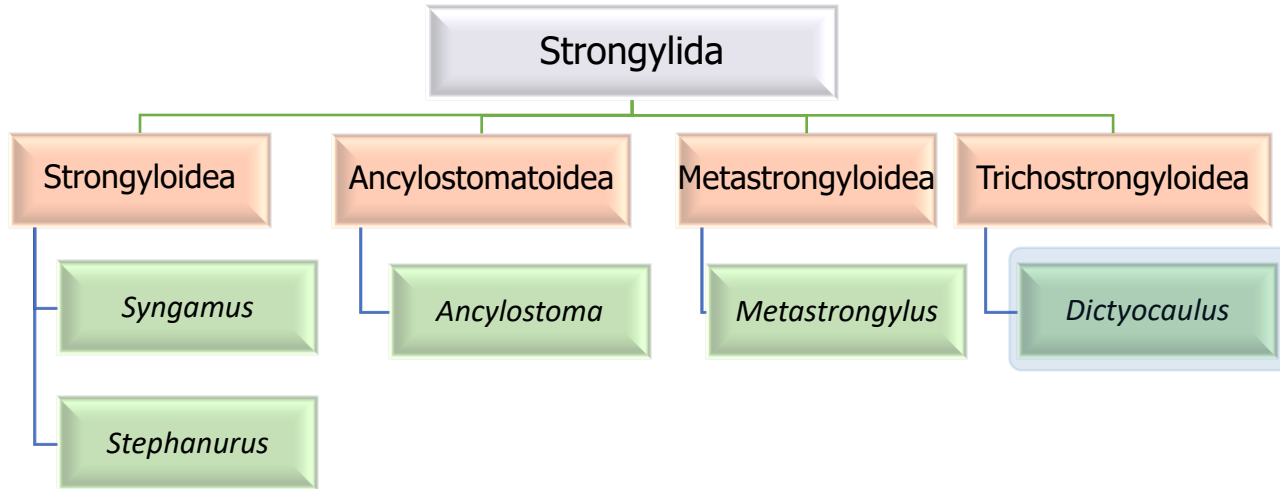
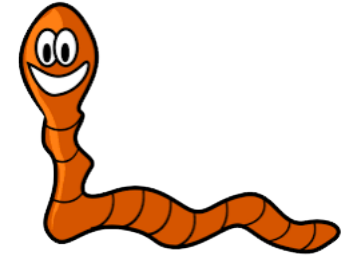


Metastrongylus
Extremidade anterior

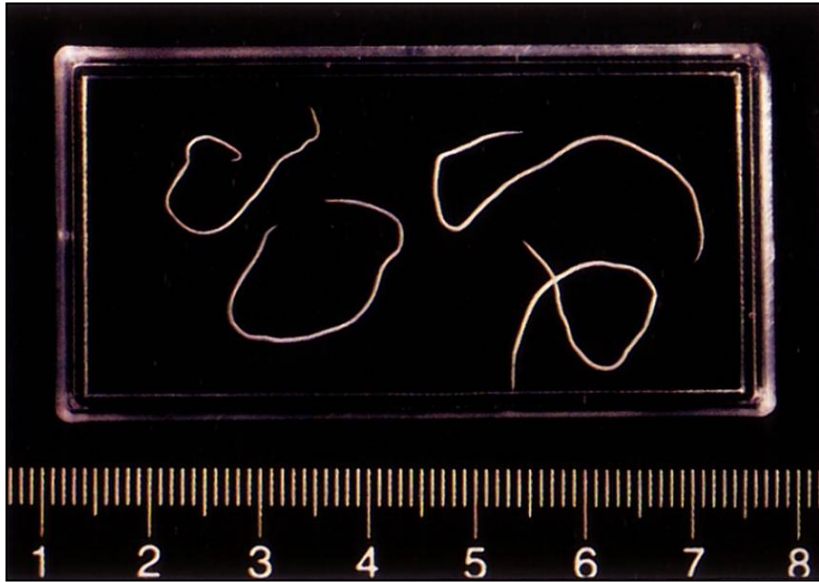
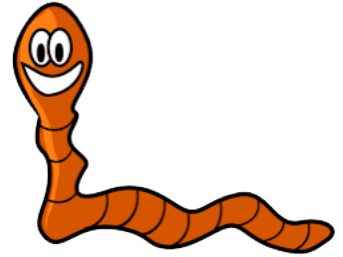


Metastrongylus
Extremidade posterior

Ordem Strongylida – classificação



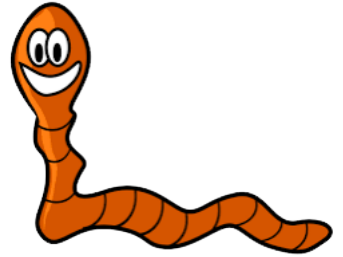
Dictyocaulus spp. – formas adultas



Tamanho (mm):

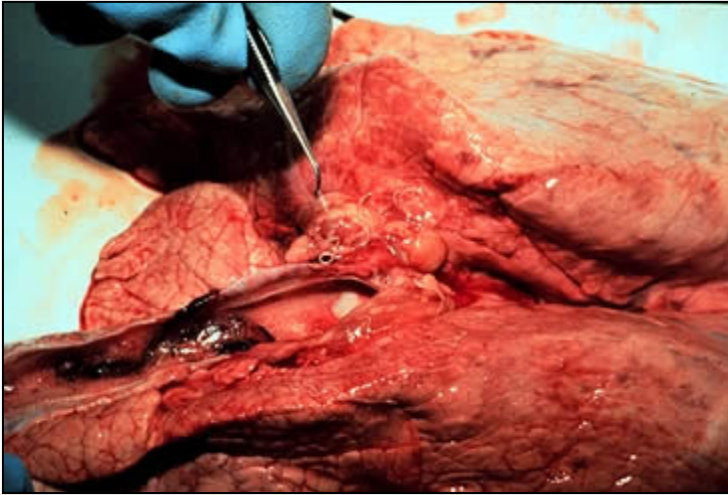
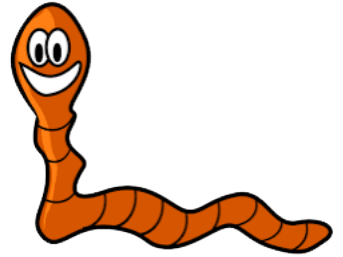
- *Dictyocaulus viviparus* – 15-50 (M), 23-80 (F)
- *Dictyocaulus filaria* – 25-80 (M), 43-112 (F)
- *Dictyocaulus arnfieldi* – 25-43 (M), 43-68 (F)
- Hospedeiros: ruminantes, eqüinos e asininos

Dictyocaulus spp. – formas adultas

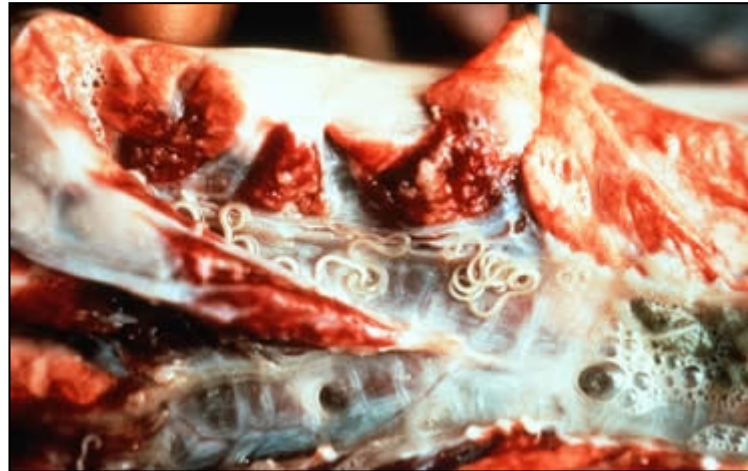


Pulmão de bovino

Dictyocaulus spp. – formas adultas



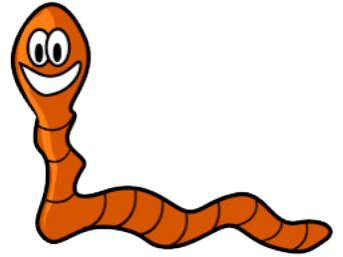
Brônquios de eqüino



Dictyocaulus spp. – ovo



- Os ovos embrionados estão presentes nos brônquios
- Formato oval com casca fina
- Presença de larva no interior





Obrigado pessoal. Até a próxima aula!

