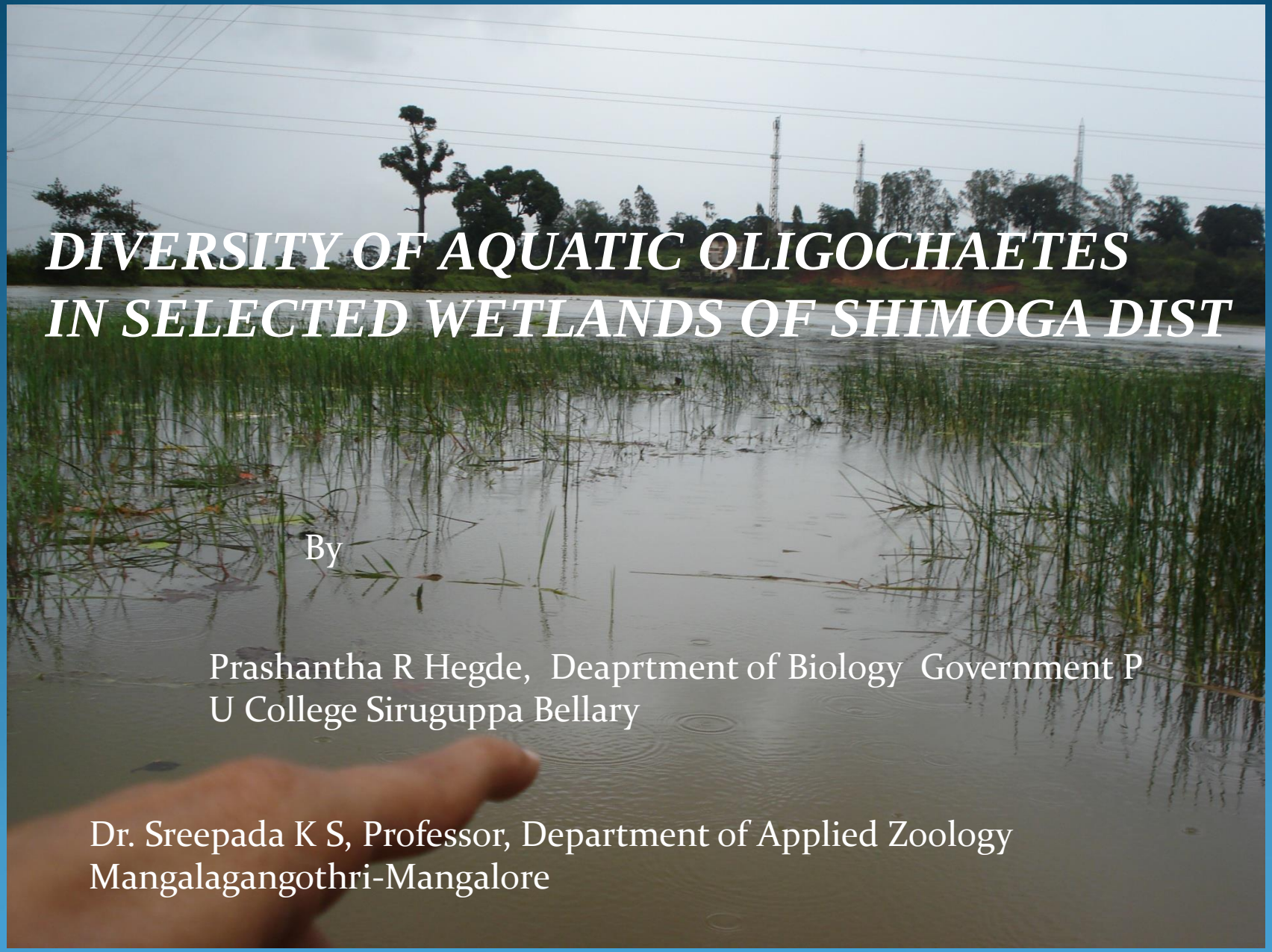

DIVERSITY OF AQUATIC OLIGOCHAETES IN SELECTED WETLANDS OF SHIMOGA DIST

By

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Aquatic microdrils.

BIOINDICATORS

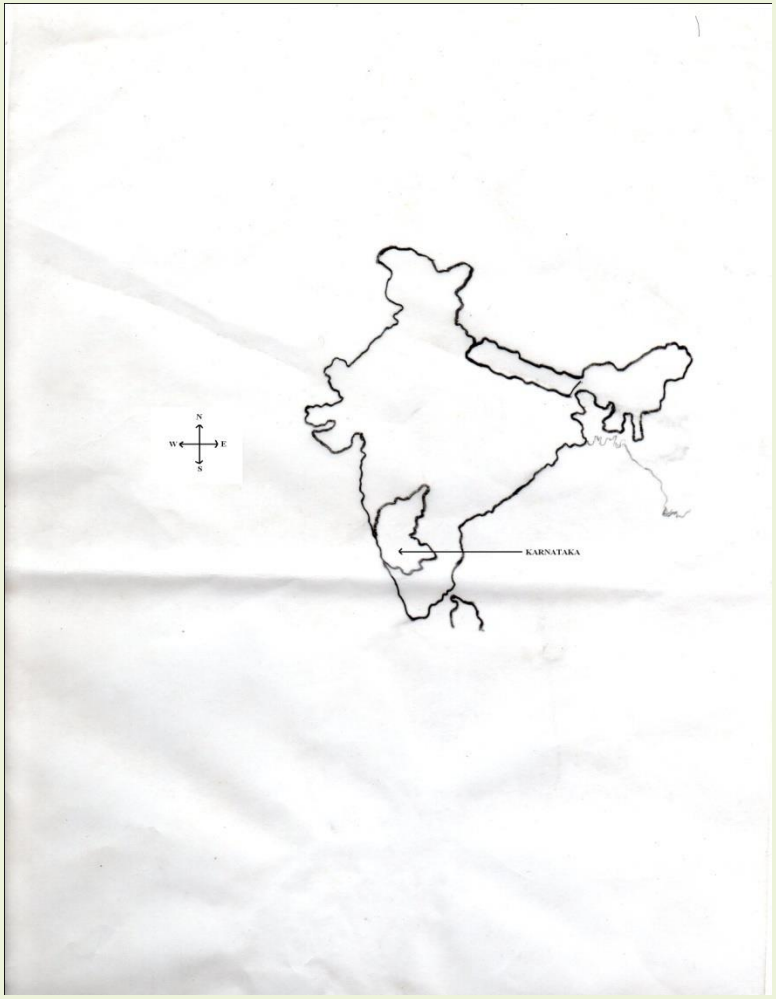
Microscopic annelids

- There are almost 5000 valid species of oligochaetes, about one-third of which are aquatic.
- About 1,700 valid species of aquatic oligochaetes are known to date, of these, about 1,100 are freshwater forms.
- Naidu (2005) reported 102 species of aquatic oligochaetes from India.
- Karnataka have only been surveyed and nearly 12 species of microdrile earthworms were recorded recently by Siddaraju (2012).
- These segmental worms have reduced head; no parapodia, but chaetae present.

SCOPE OF THE STUDY

- The physical and chemical characteristics of water bodies may greatly influence the population density of microdriles.
- The baseline data on the species distribution and their seasonal abundance in oligotrophic and eutrophic water bodies of Western Ghats region will provide information on water quality and oligochaete as bioindicators.
- The microdril culture studies and the selection of alternative species is essential for fish culture practices.

STUDY AREA




Sampling sites


Sampling sites

COLLECTION OF SAMPLE


Seasonal sampling site-sagar

Sagar-Alalli

Ananthpur

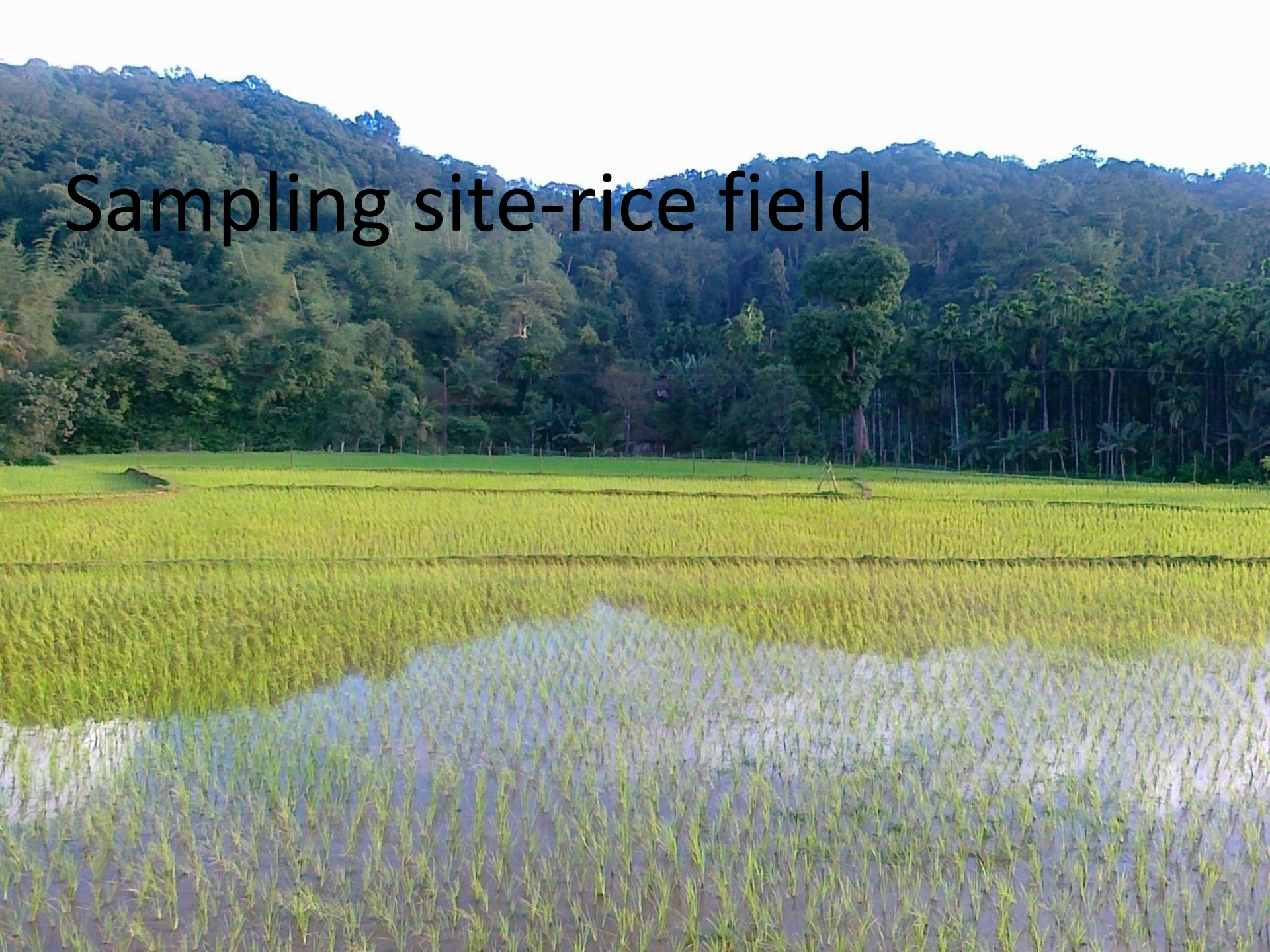

Ananthpur


Linganamakki


Screening the sample

Sampling site-Sorab

Talaguppa


Sampling site-rice field

No worms found

No worms found

Sample observations

Check list-Naididae

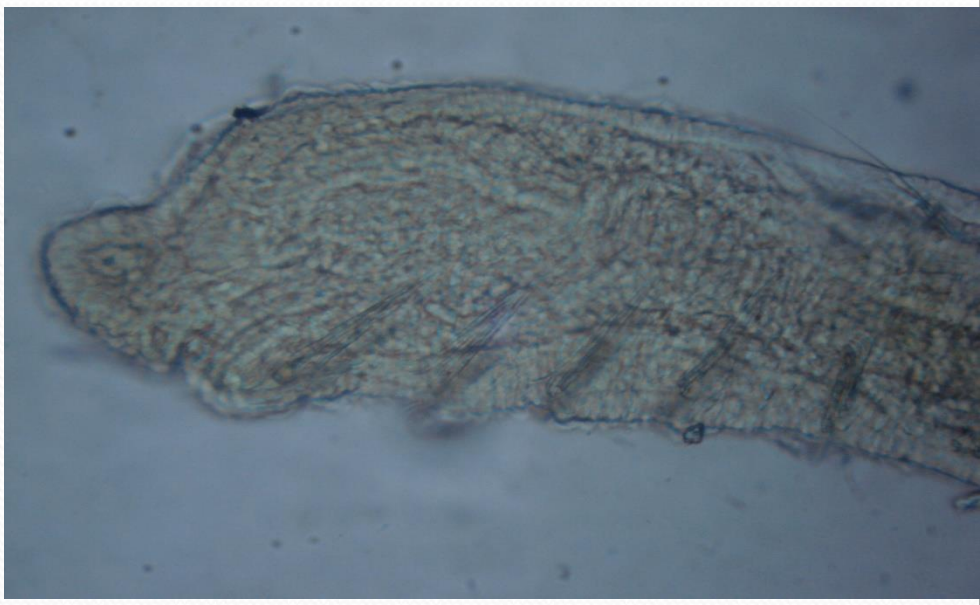
Sl no	Species	Pre-monsoon	Monsoon	Post - monsoon
1	*Aulophorus furcatus* (Müller, 1773)	++++	+	++
2	*Aulophorus moghei* Naidu & Srivastava, 1980	++	+	+++
3	*Dero dorsalis* Ferroniere, 1899	+++	-	++
4	*Allonais paraguayensis* (Michaelsen, 1905)	++++++	+	+
5	*Allonais gwaliorensis* (Stephenson, 1920)	++	-	+
6	*Chaetogaster* sp. Sperber, 1948	+	_	_
7	*Dero digitata* (Muller, 1773)	+++++	+	+
8	*Dero sawayai* Marcus	+	_	_

Checklist -Pristinidae

Sl no	Species	Pre-monsoon	Monsoon	Post monsoon
1	*Pristina synclites* Stephenson, 1925	+	_	_
2	*Pristina menoni* (Aiyer 1929)	+	+	+
3	*Pristina jenkinae* (Stephenson, 1931)	_	_	+
4	*Pristina longiseta* Ehrenberg, 1828	+++	_	+
5	*Pristina proboscidea* Beddard, 1896	+	_	+
6	*Pristina breviseta* Bourne, 1891	+	+	+

Species identification

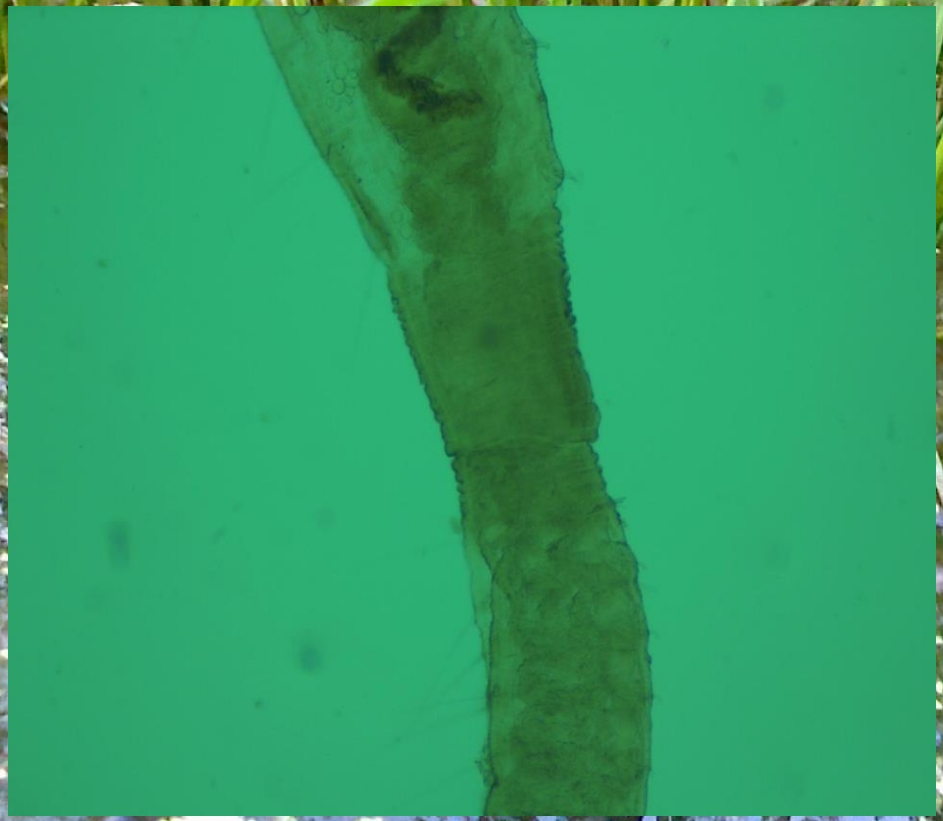
- The identification of species was done by using standard keys of Brinkhurst (1971), Naidu and Naidu (1981) and Milligan (1998).
- Identification is based on the following features
- Type of the dorsal setae
- Type of ventral setae
- Position of first dorsal setae



Dero furcata

- Dorsal seta begin in V segment
- Needle setae simply bifid
- Budding zone after 19th segment
- Distal tooth of needle setae thinner, shorter than proximal.
- Medium sized worms with pale brown colour

Dero furcata-budding zone



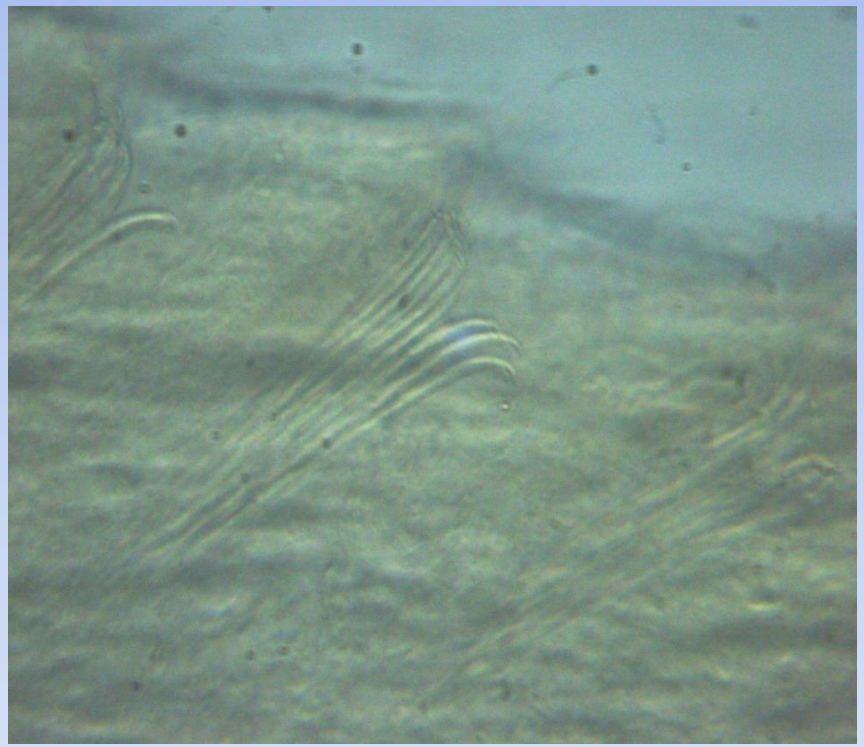

Dero vagus

Dero vagus

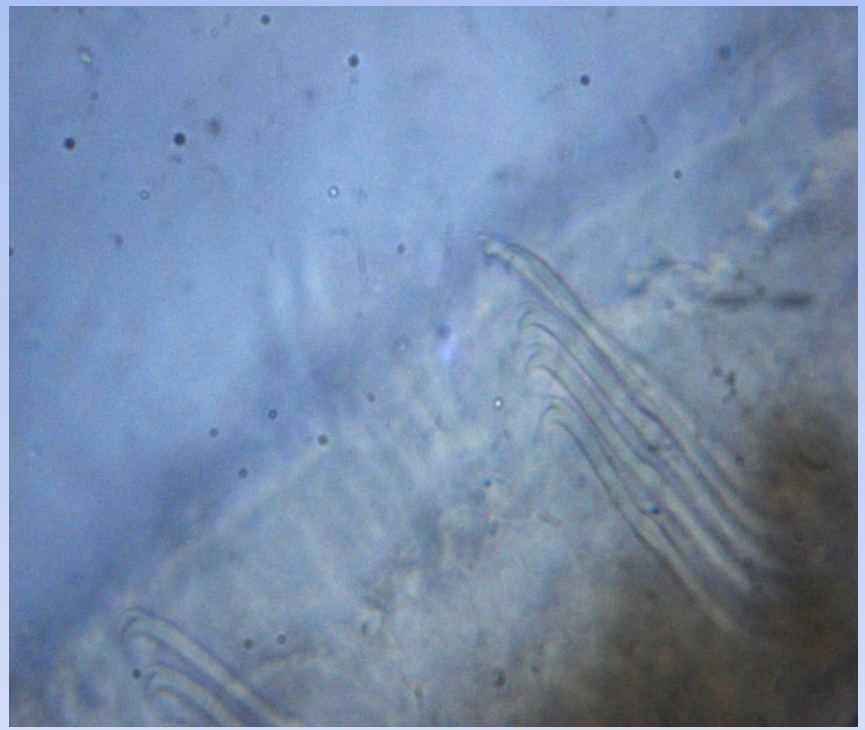
- Dorsal setae begin in VI
- Dorsal palmate setae(symmetrically expanded)
- The bifid ventral with two times the length of lower
- Strongly diverging palps at posterior end
- Large number of anterior ventral setae

Dero vagus

Anterior ventral



Posterior ventral



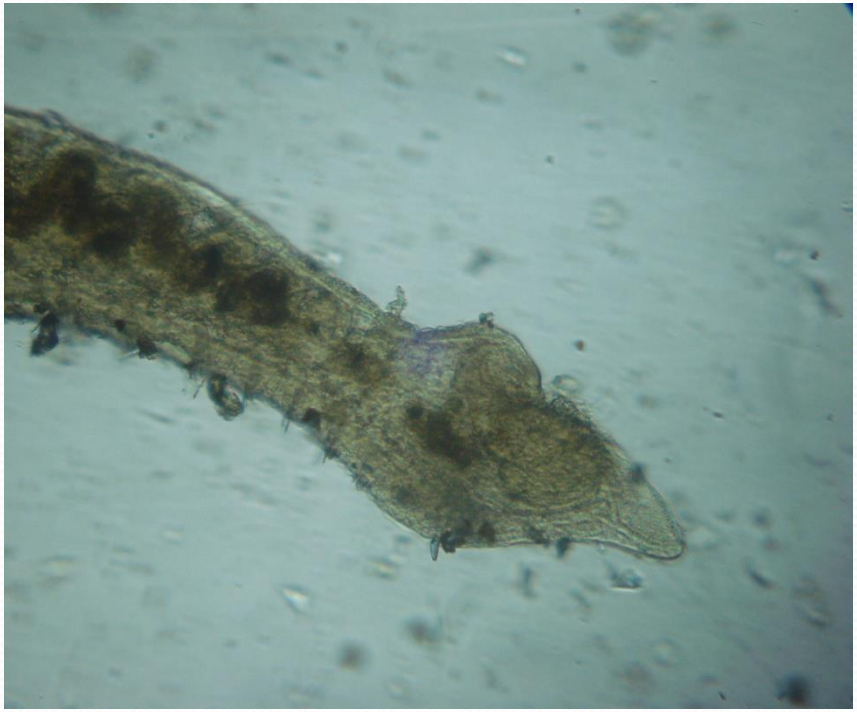
Dero digitata

- Branchial fossa with four pairs of gills.
- Needle teeth equal, distal tooth longer than proximal.
- Prostomium is bluntly triangular.
- Dorsal bundle from VI segment, with 1 hair and 1 bayonet shaped setae.
- Ventral seta 4-5 per bundle .

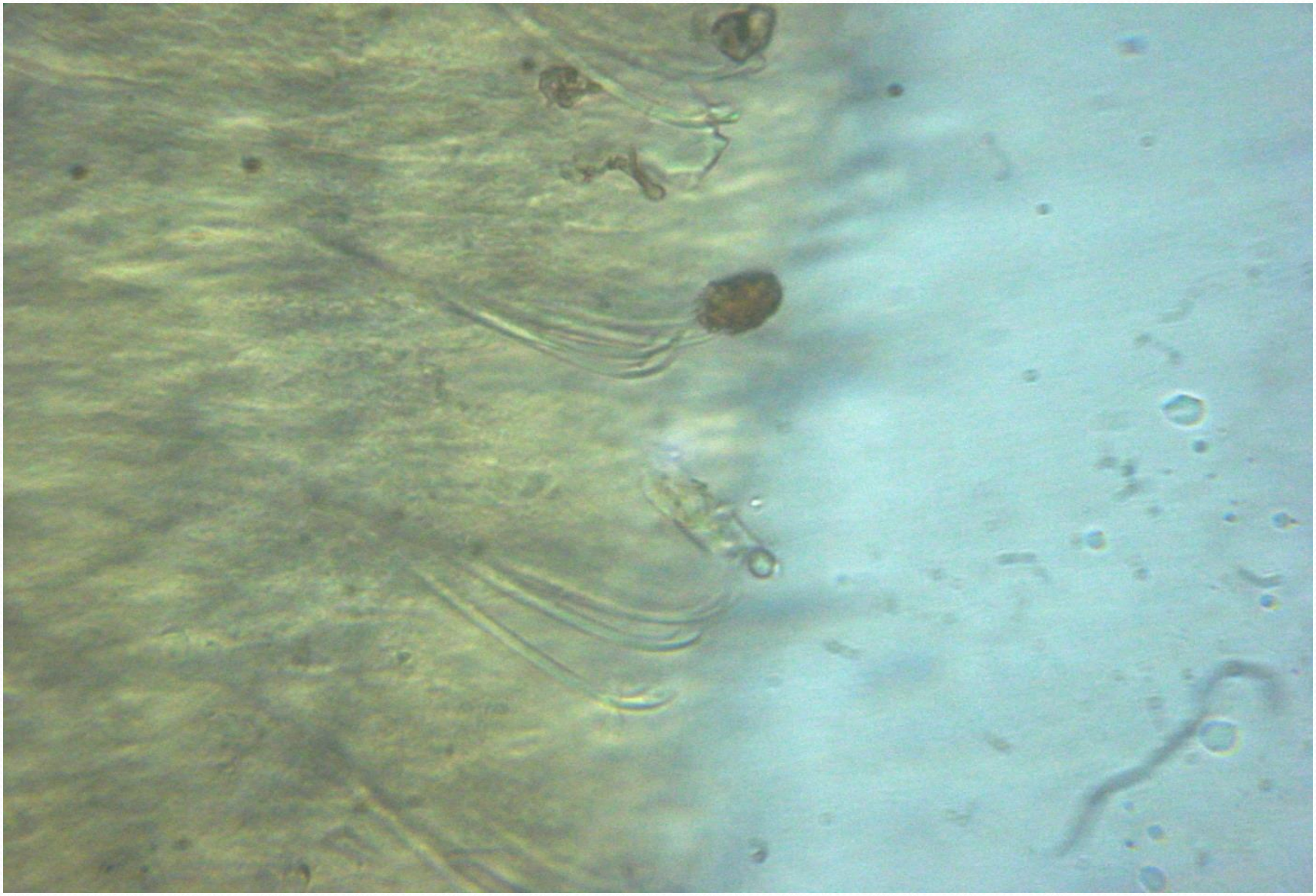
Dero digitata

Anterior region

Posterior region

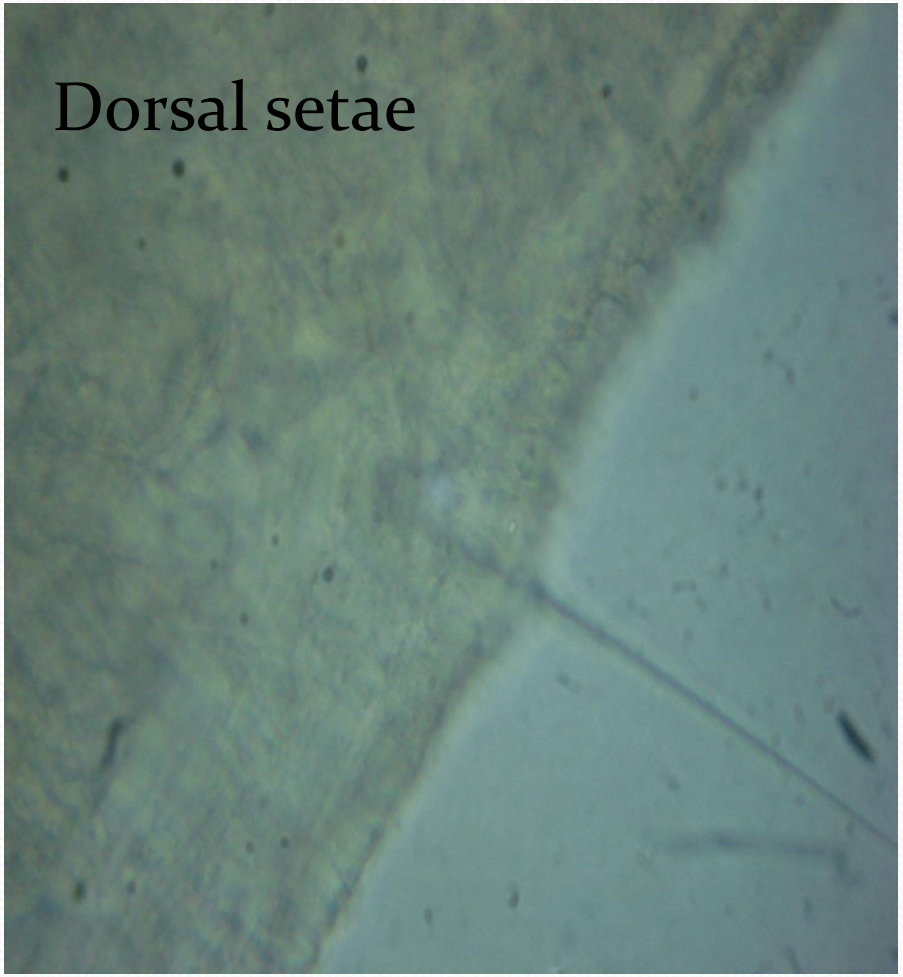


Dero digitata-ventral setae



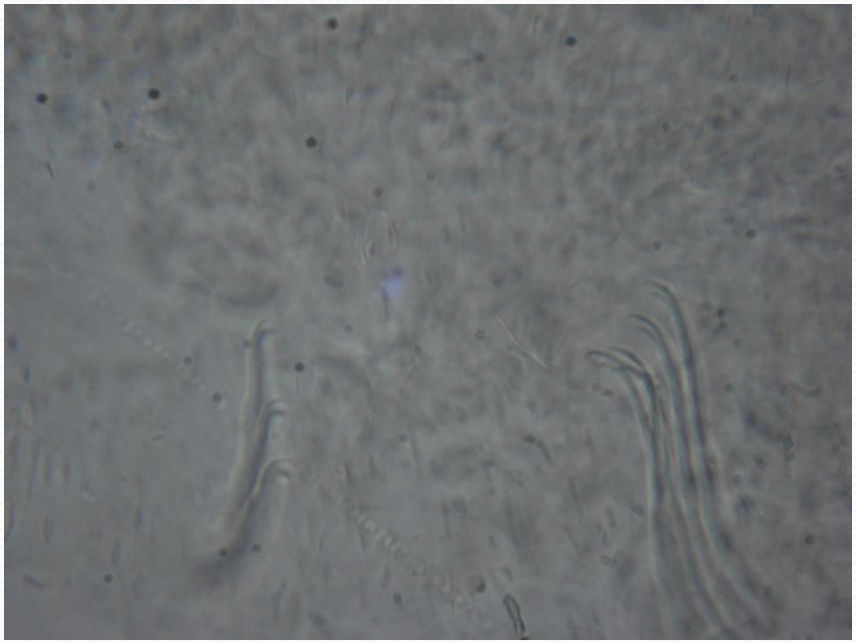
Dero sawayai

- Dorsal setae begin on VI
- Dorsal smooth hair setae
- Needle teeth unequal

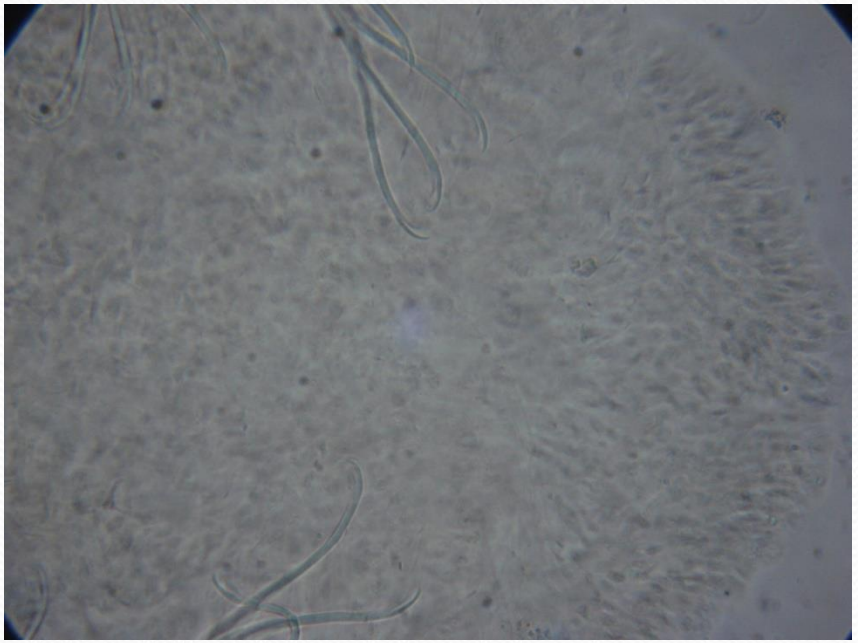


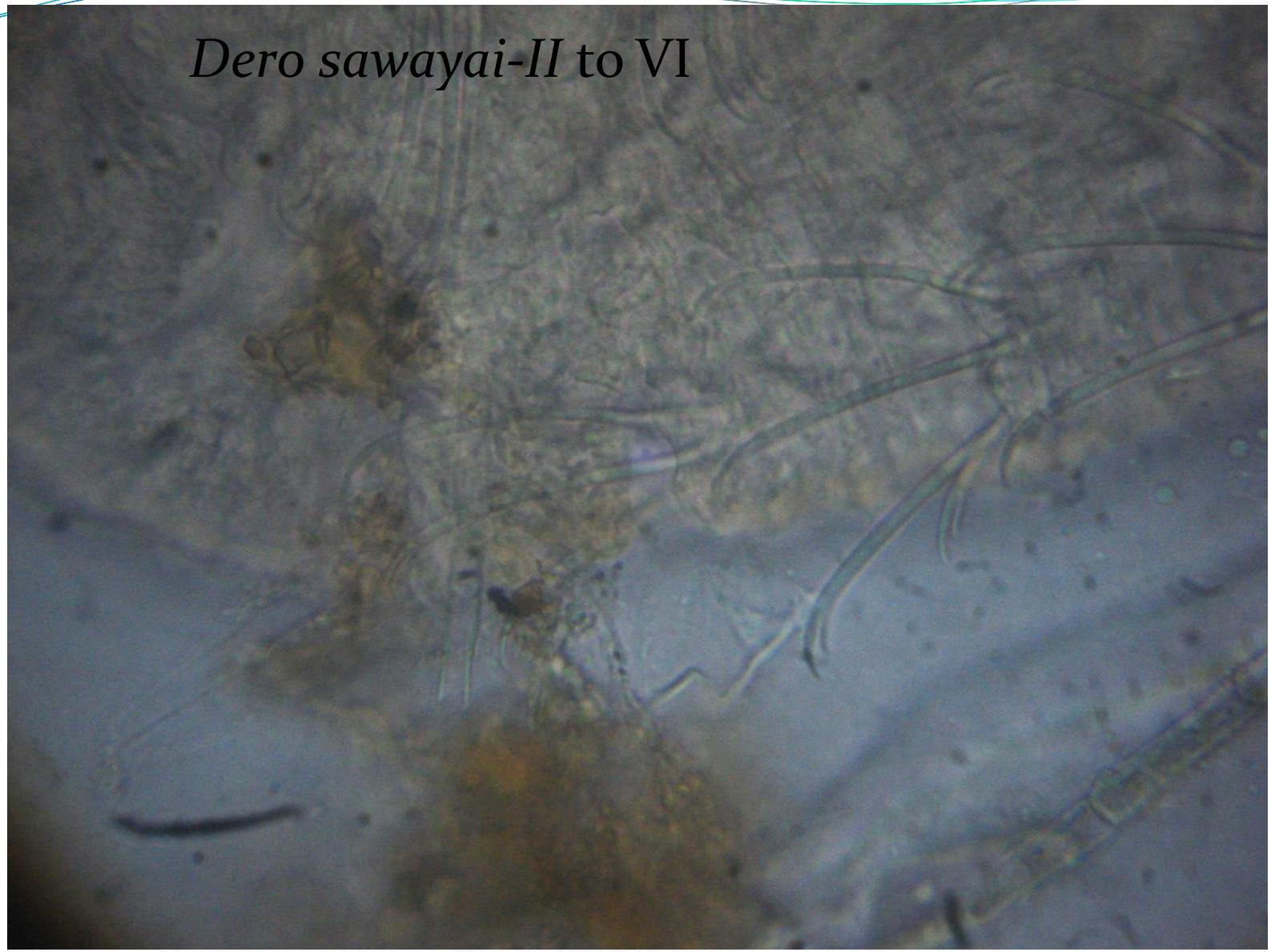
Dero sawayai-

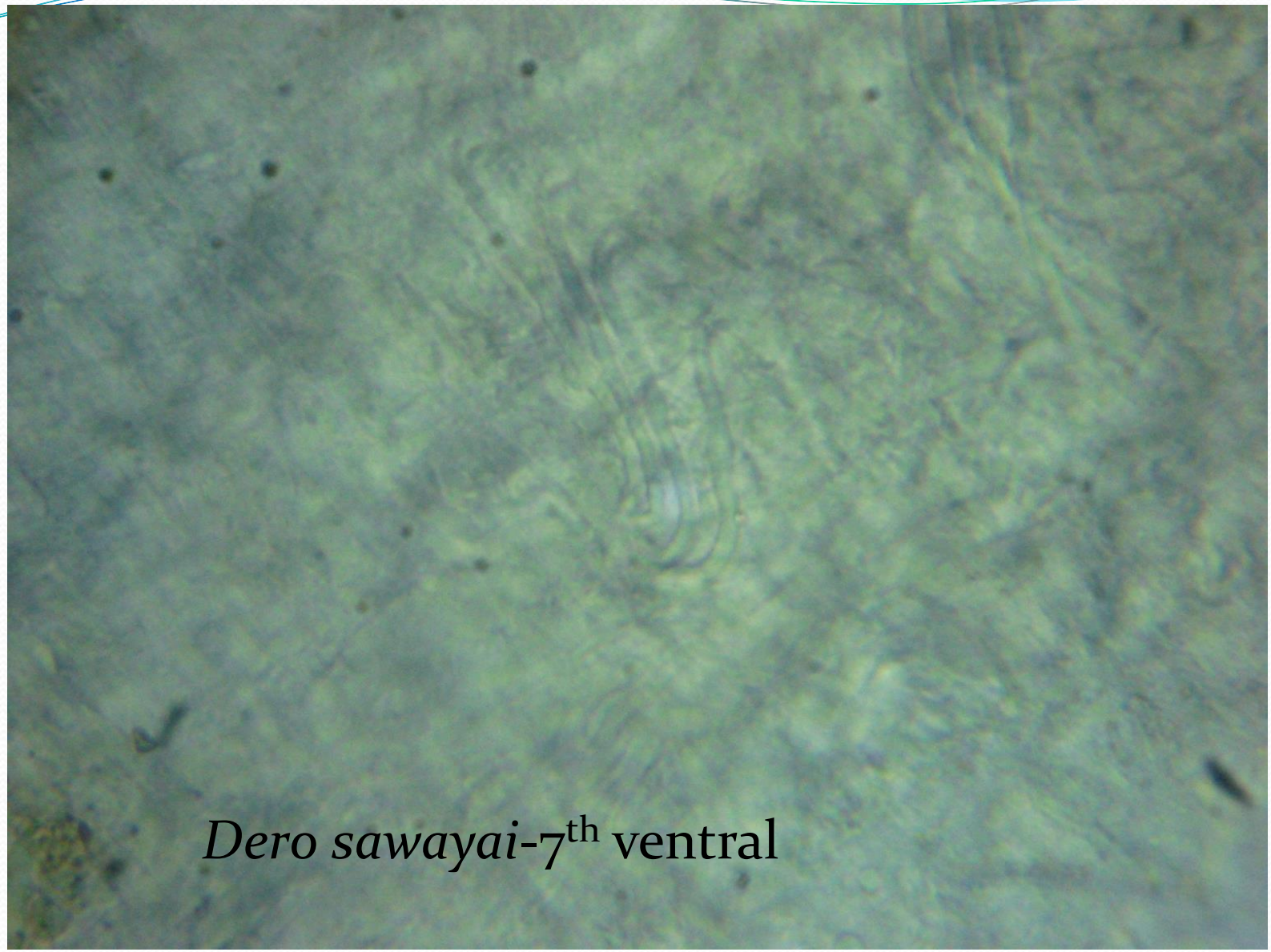
- D. sewayai-V(left) and VI



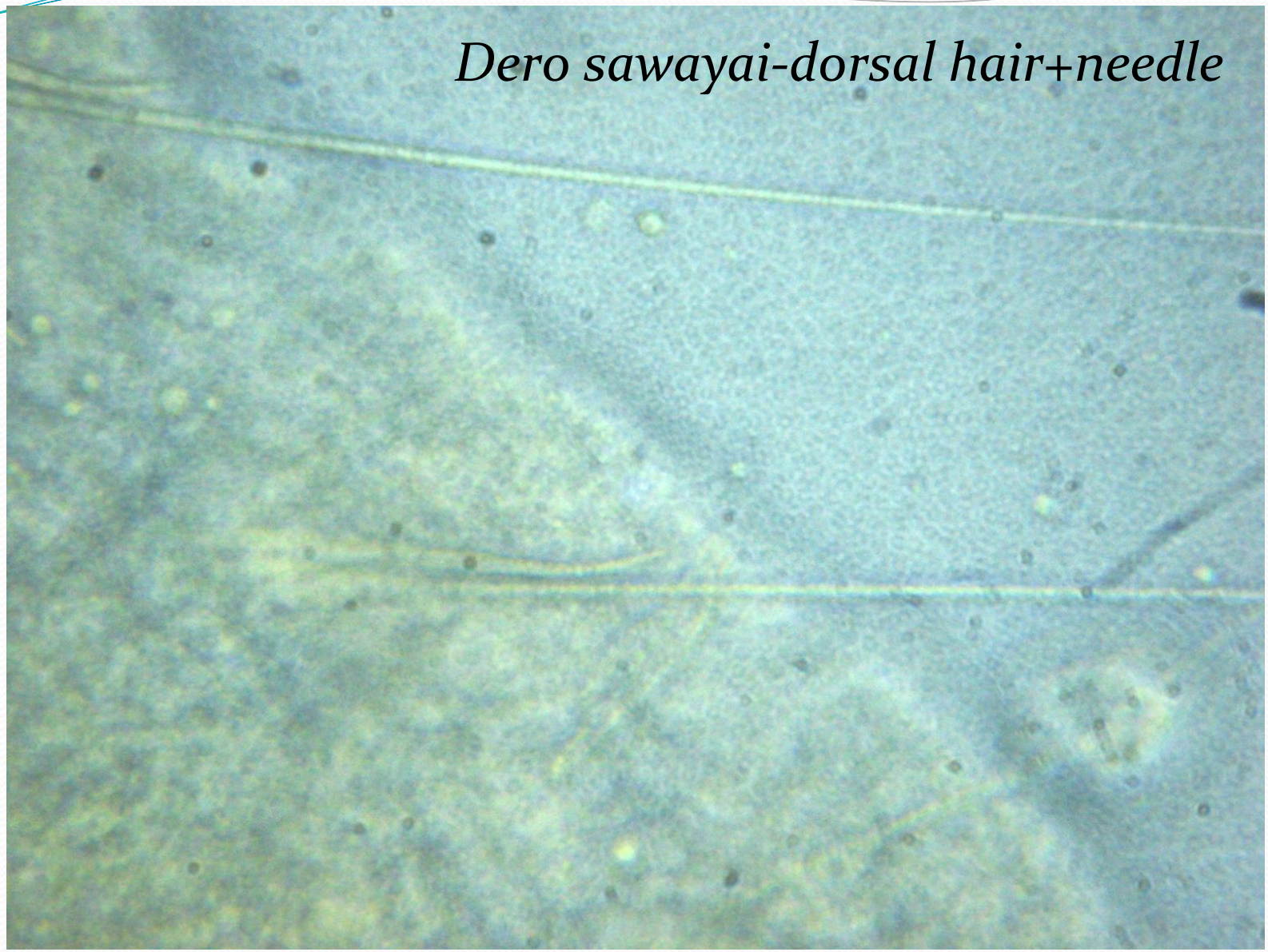
- II ventral



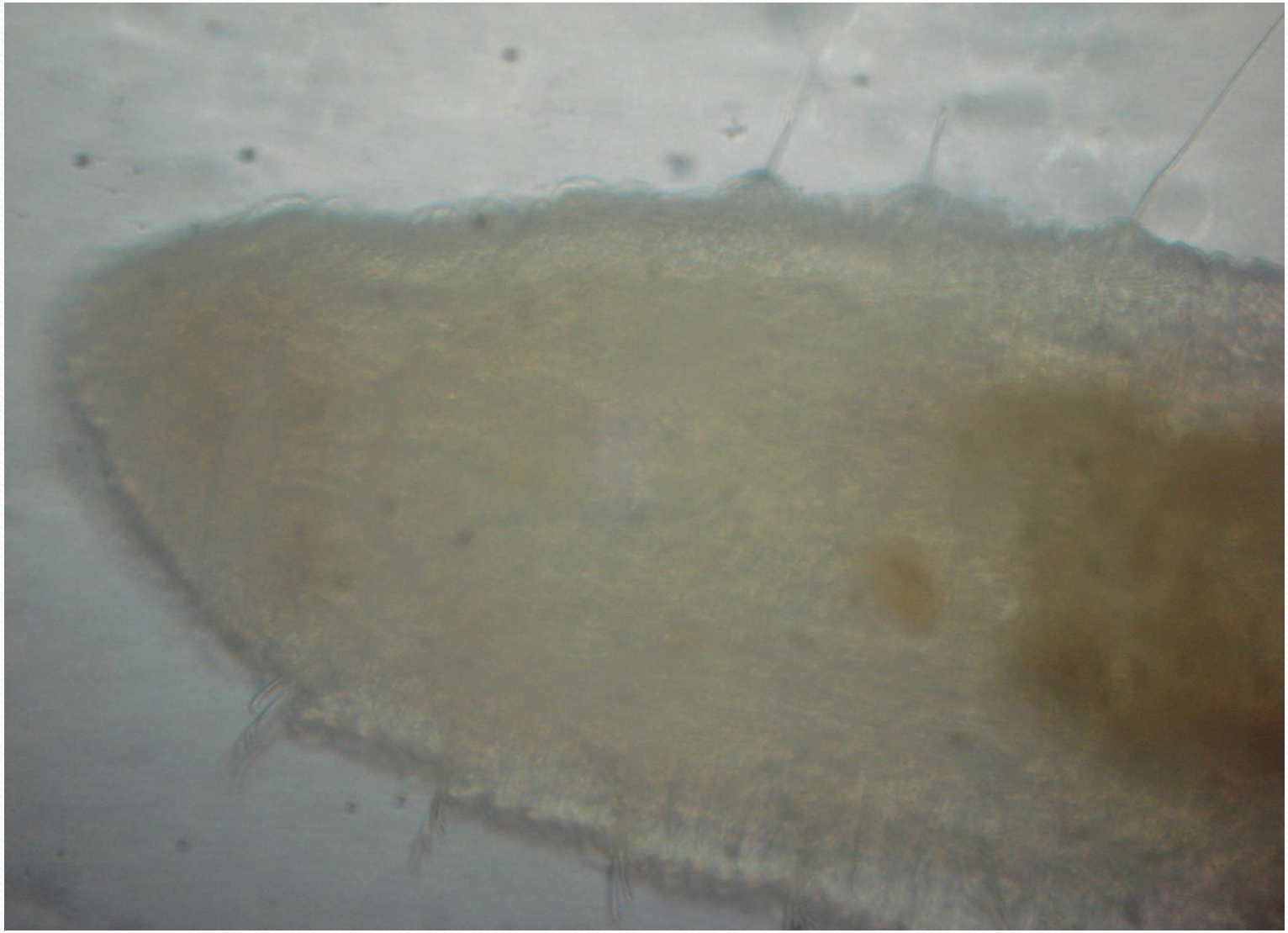

Dero sawayai-II to VI



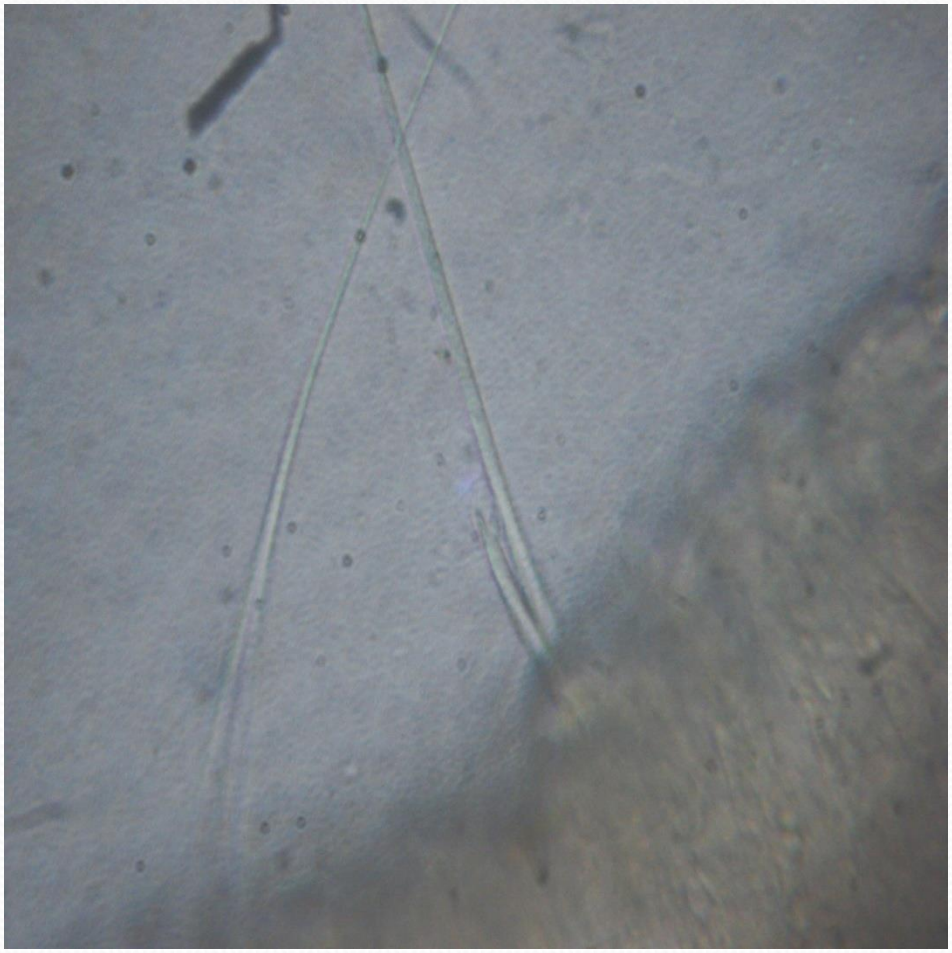
Dero sawayai-7th ventral

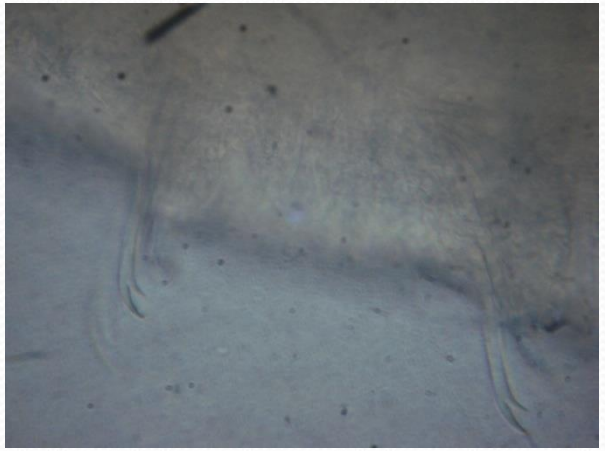

Dero sawayai-dorsal hair+needle

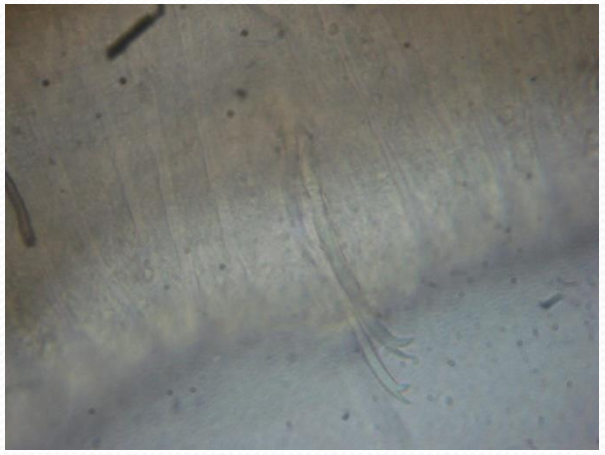
Dero dorsalis



Dero dorsalis (dorsal-2nd ventral and post. ventral)





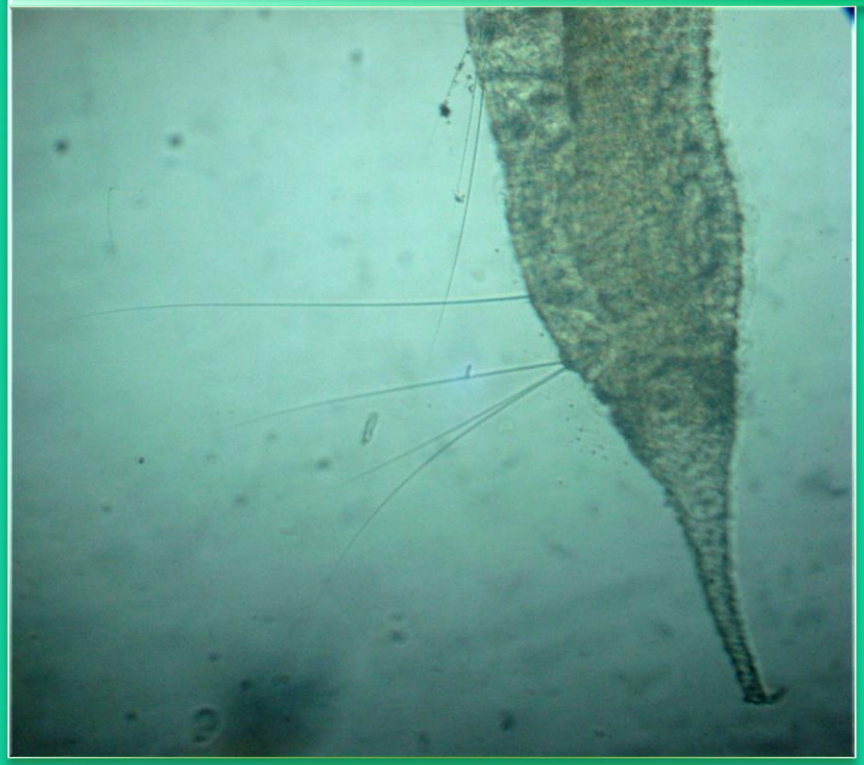


Dero dorsalis

Pristina longiseta

- Dorsal seta begin in II
- Needle seta simple and pointed
- Elongate seta present in III
- Prostomium is bluntly triangular with long proboscis
- Worms are small, slender, delicate and pale yellow.

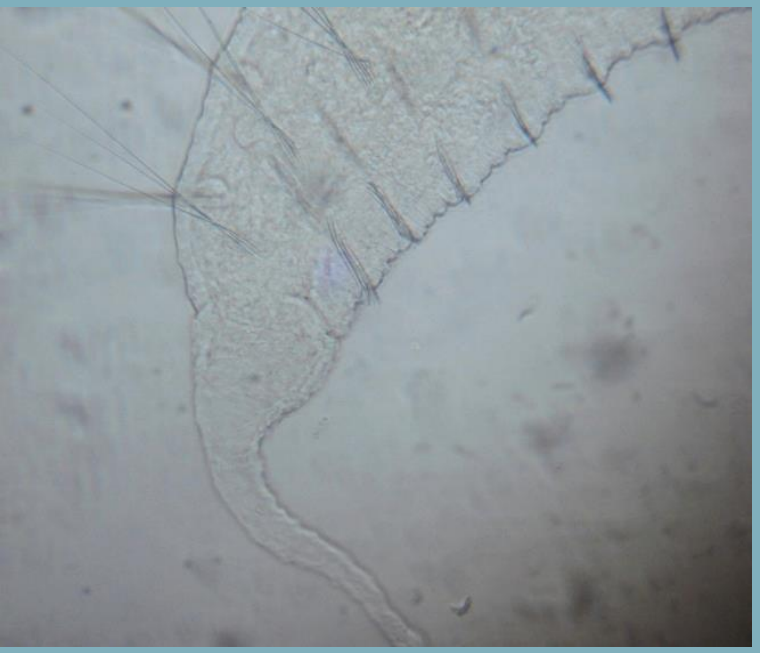
Pristina longiseta

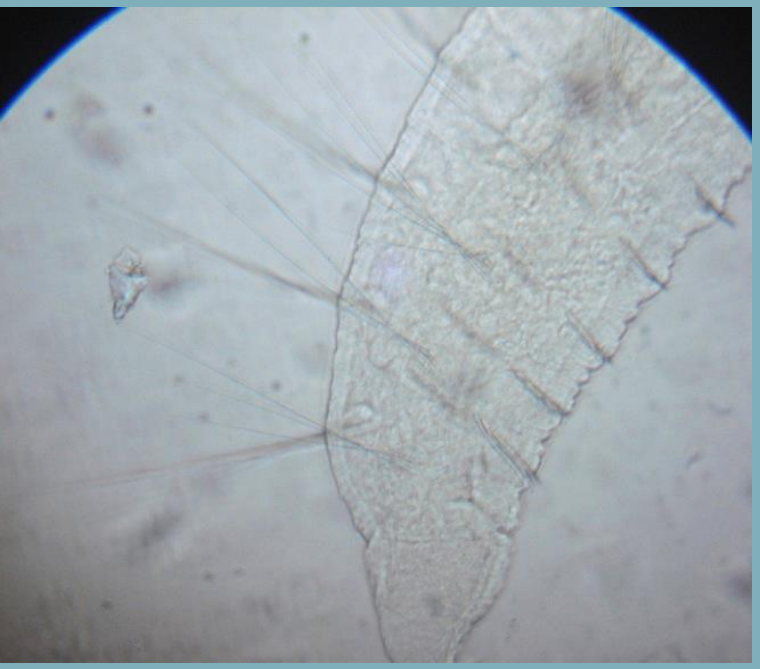


Anterior

Posterior


P. longiseta

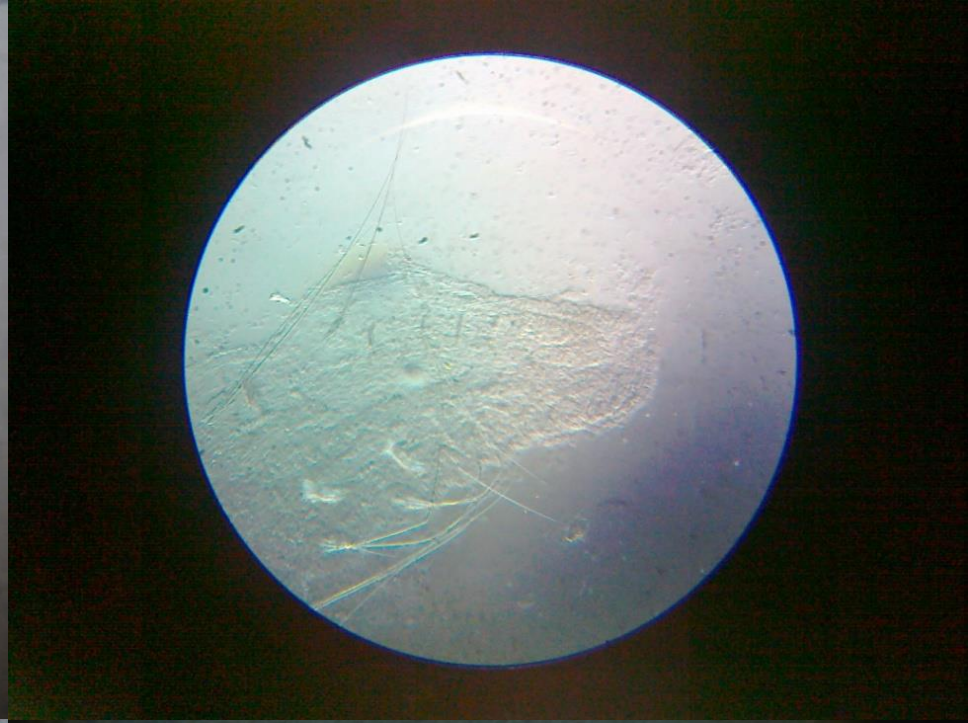


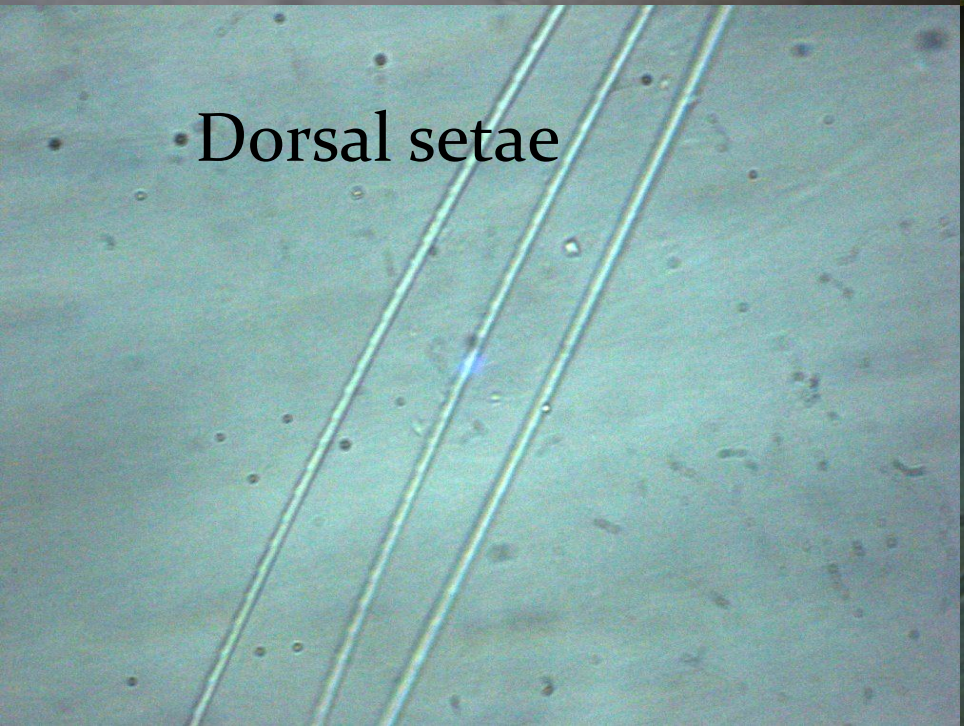


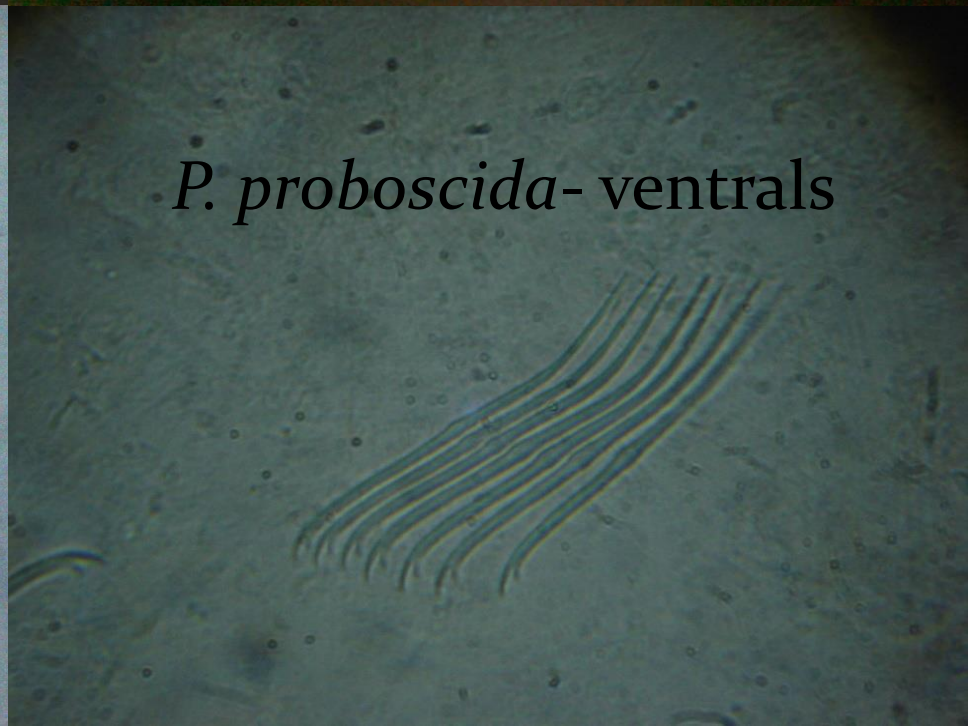
Pristina proboscida

- Very long proboscis but III dorsal setae is not elongated
- Two-three long serrated dorsal hair of equal length
- Dorsal from the II segment. Eyes are absent
- About 7-8 ventral seta per bundle increasing posteriorly with upper tooth longer


P. proboscia

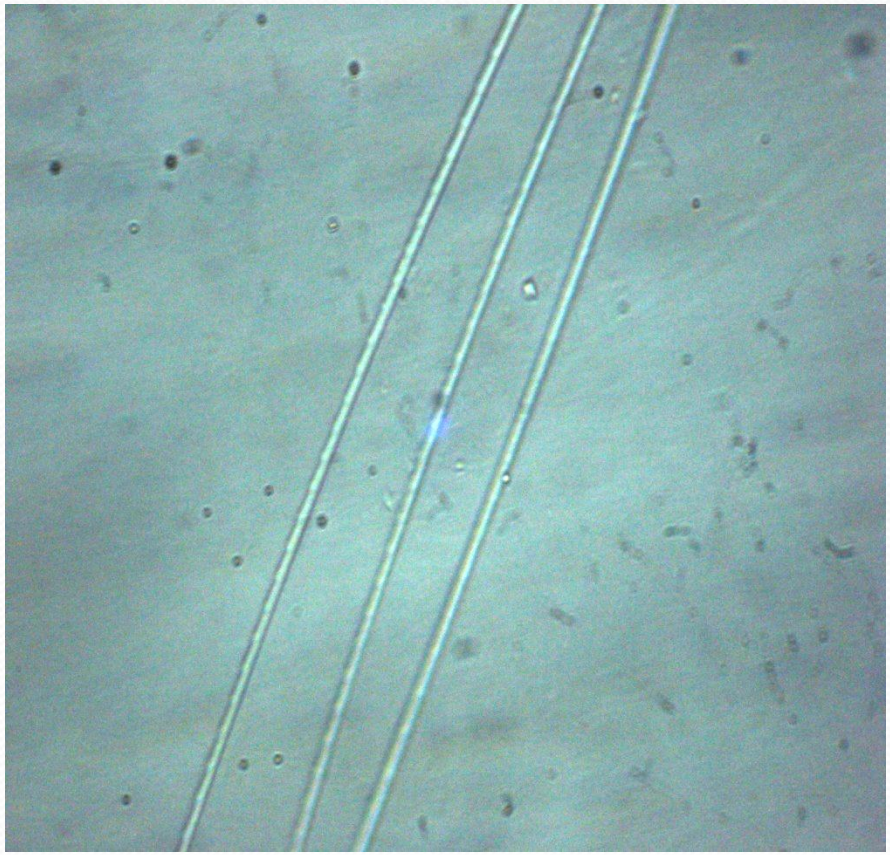



Dorsal setae

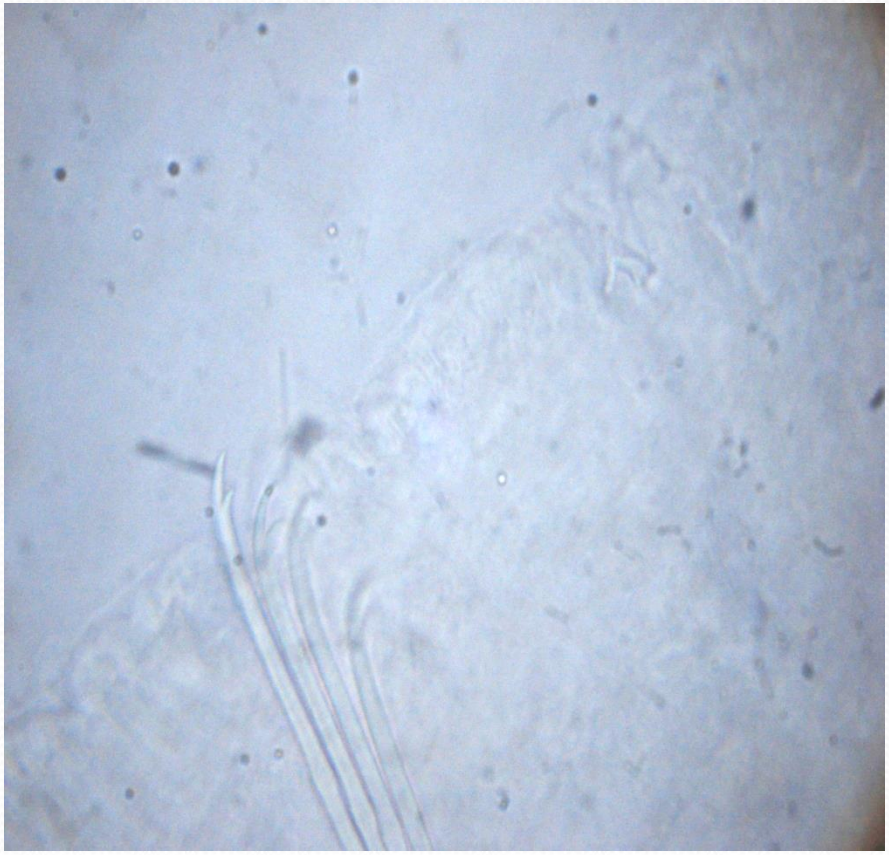

P. proboscida- ventrals

Pristina proboscida

Dorsal setae-serrated



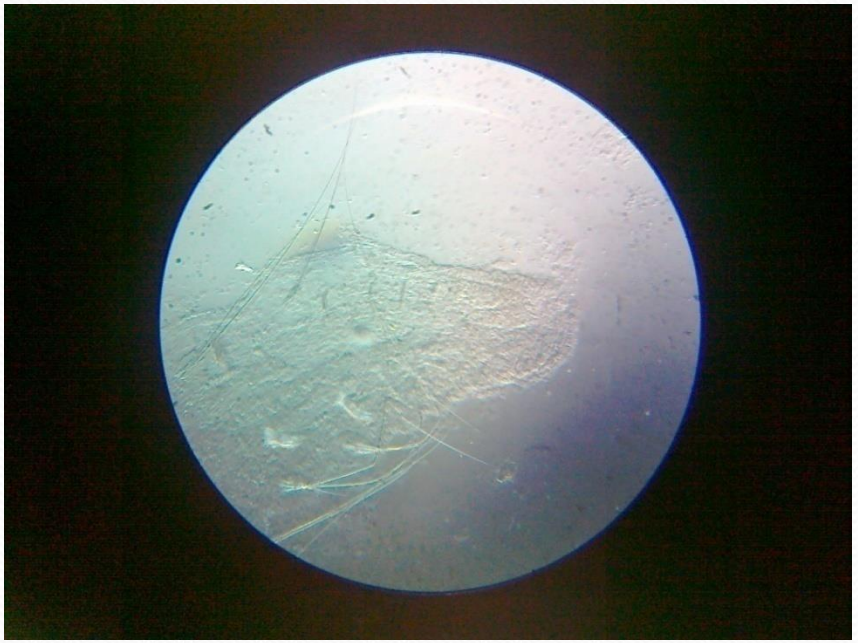
Ventral setae



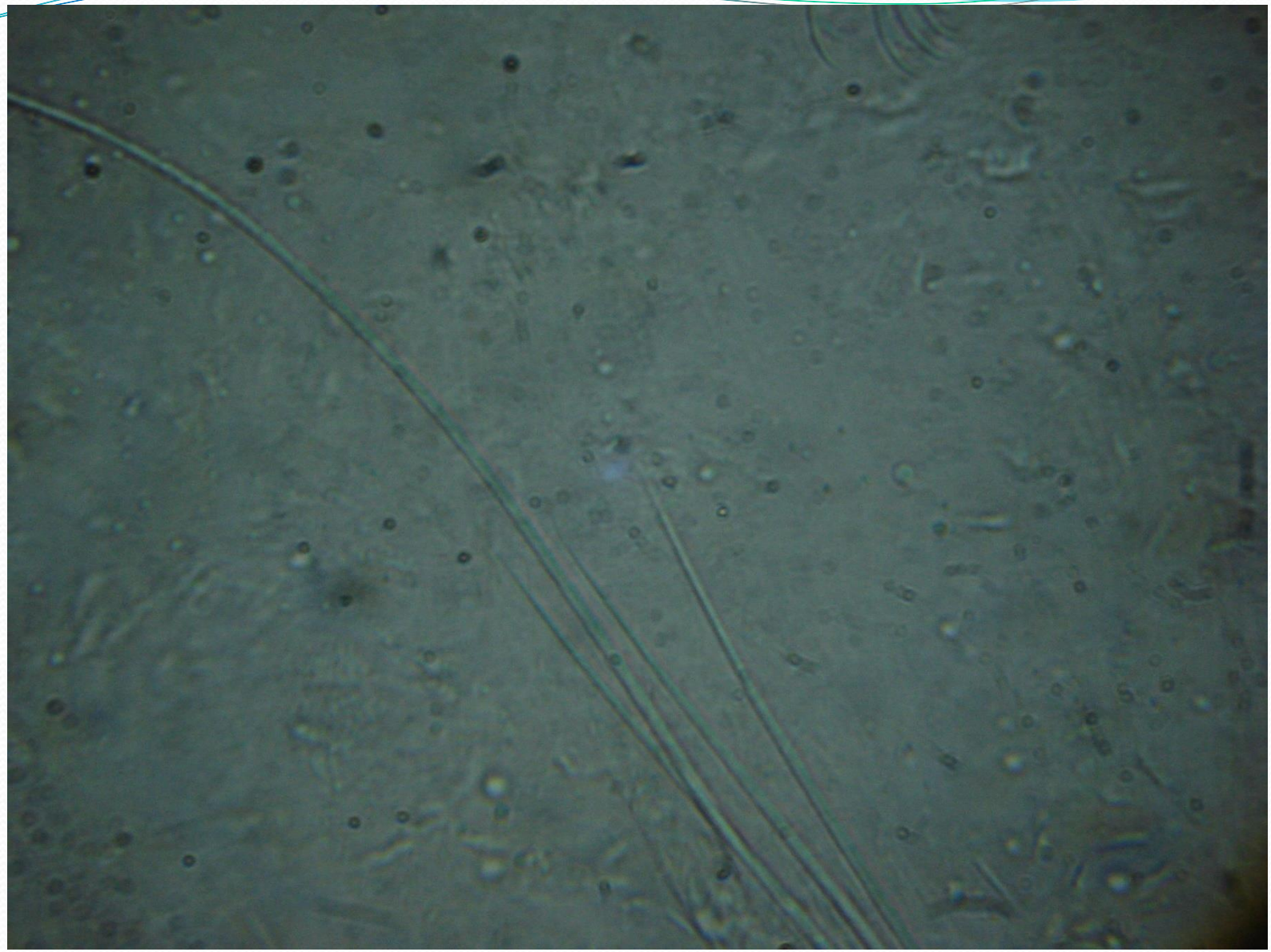
P.proboscida

- Ventral setae

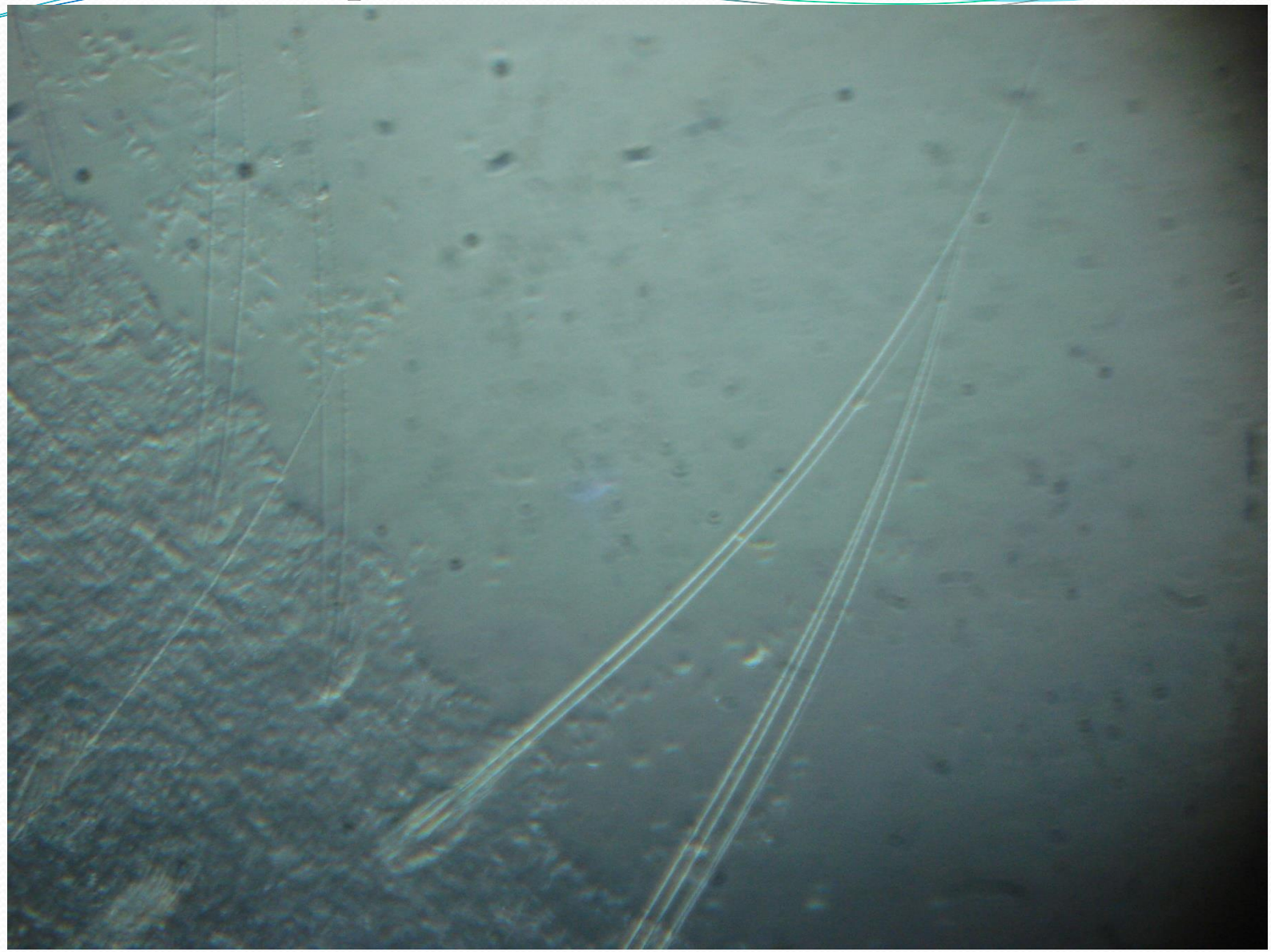
- Posterior end

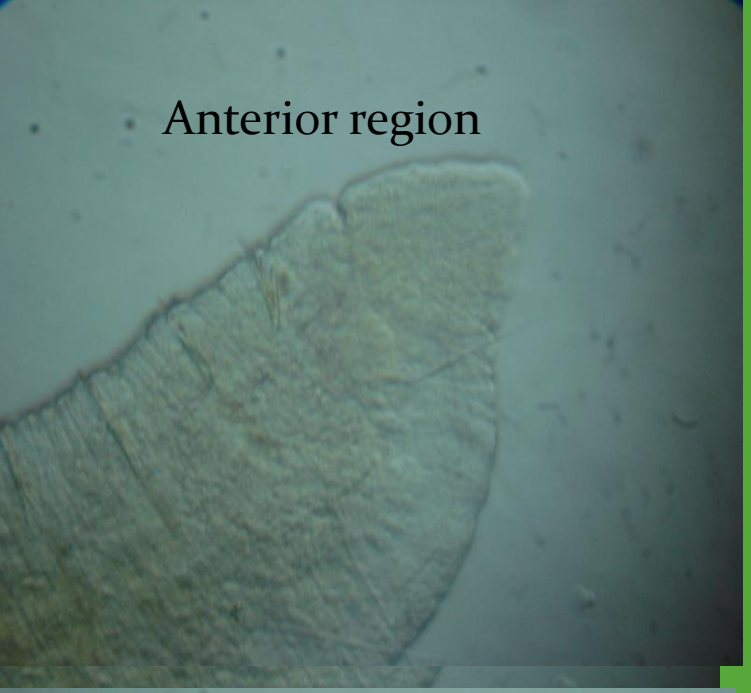


- *P.proboscida*-dorsal



- *P.proboscida*-dorsal serrations-10x

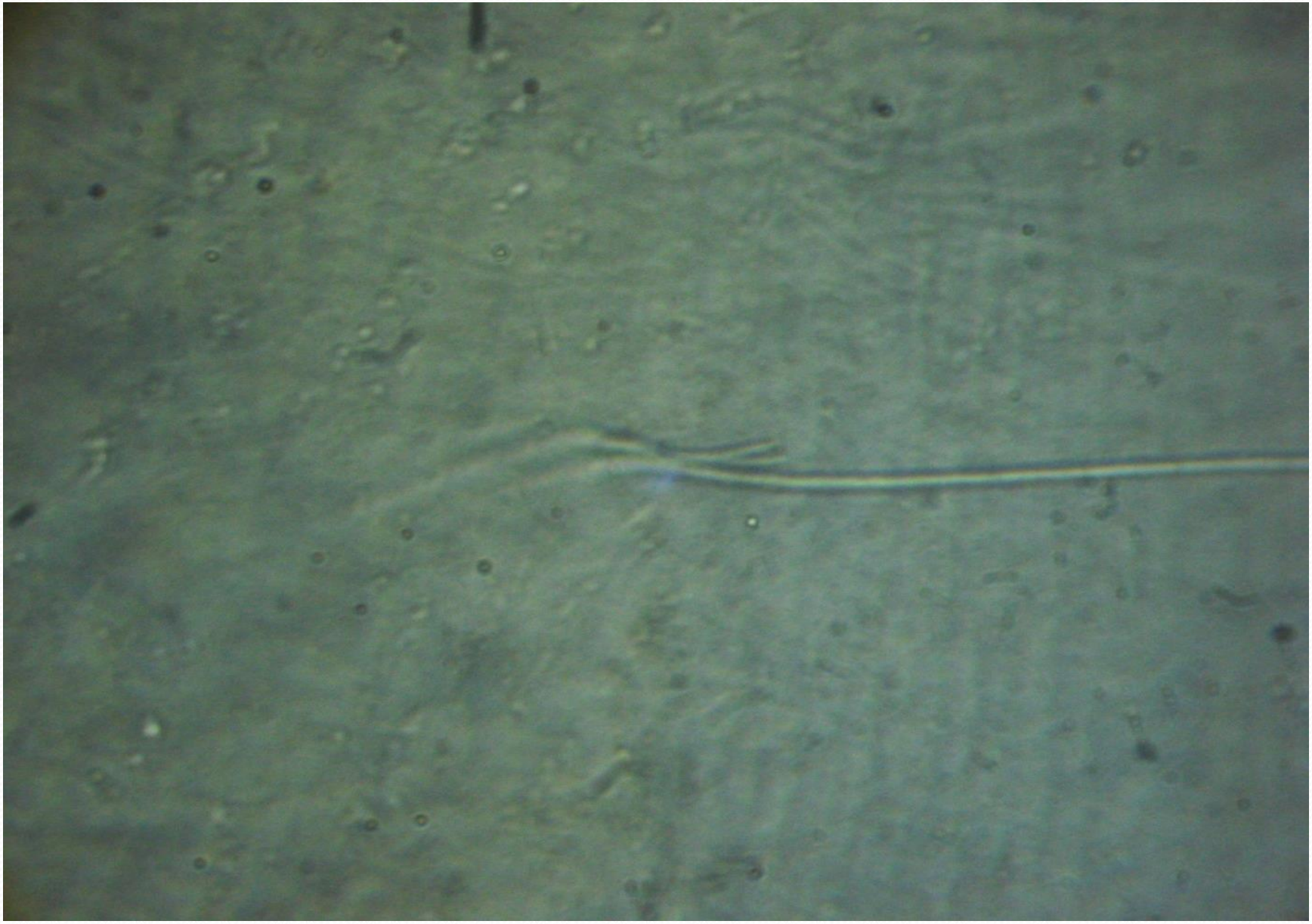




Pristina synclites

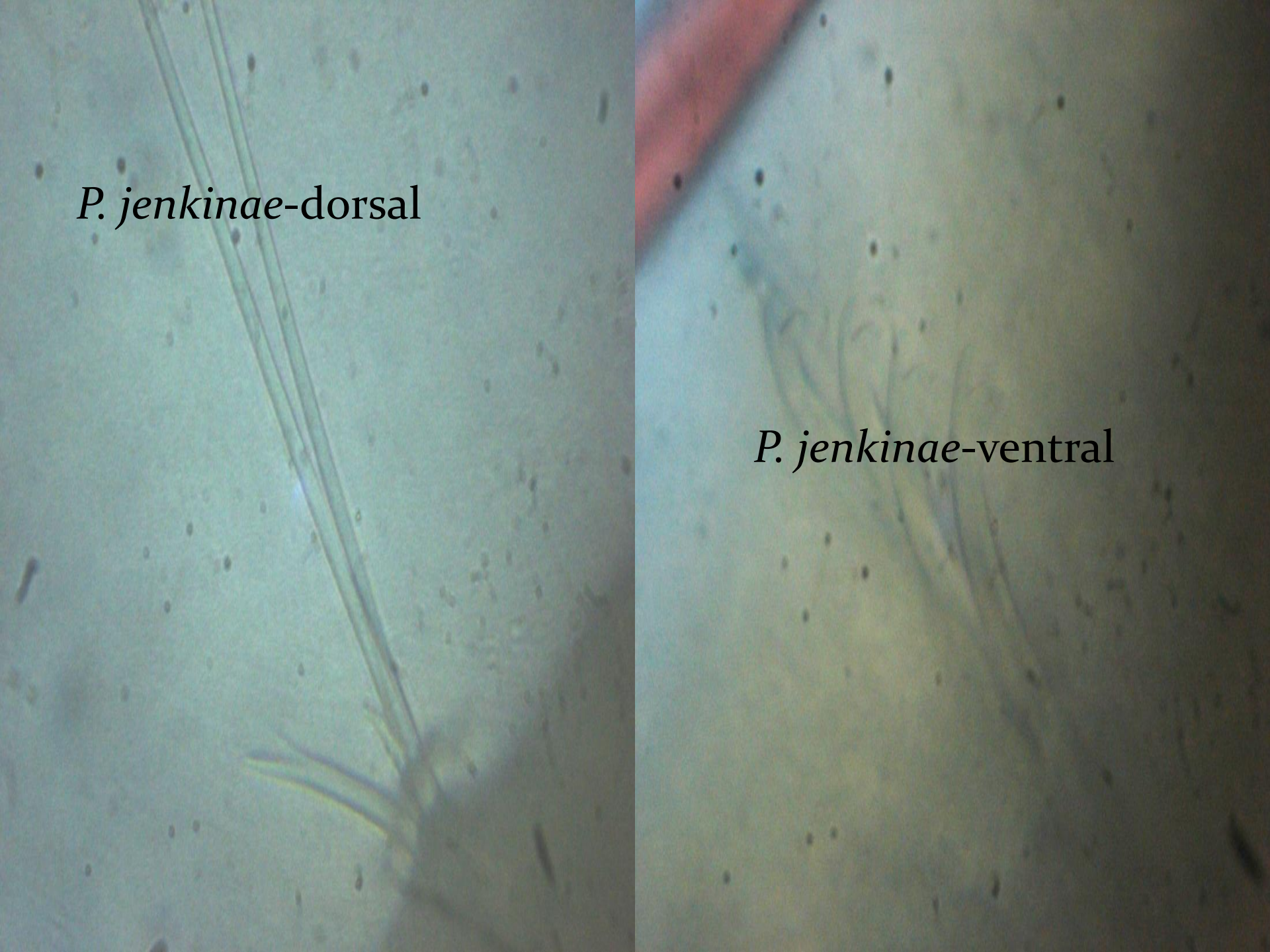
- Teeth of needle setae unequal in length
- Worms live in fresh-water freely in soft mud
- Worms coil into spirals when disturbed
- Pale red worm with slender posterior half
- Dorsal setae from II
- Needle setae bifid, bayonet shaped
- Ventral setae decreasing from anterior to posterior

Pristina synclites-dorsal setae

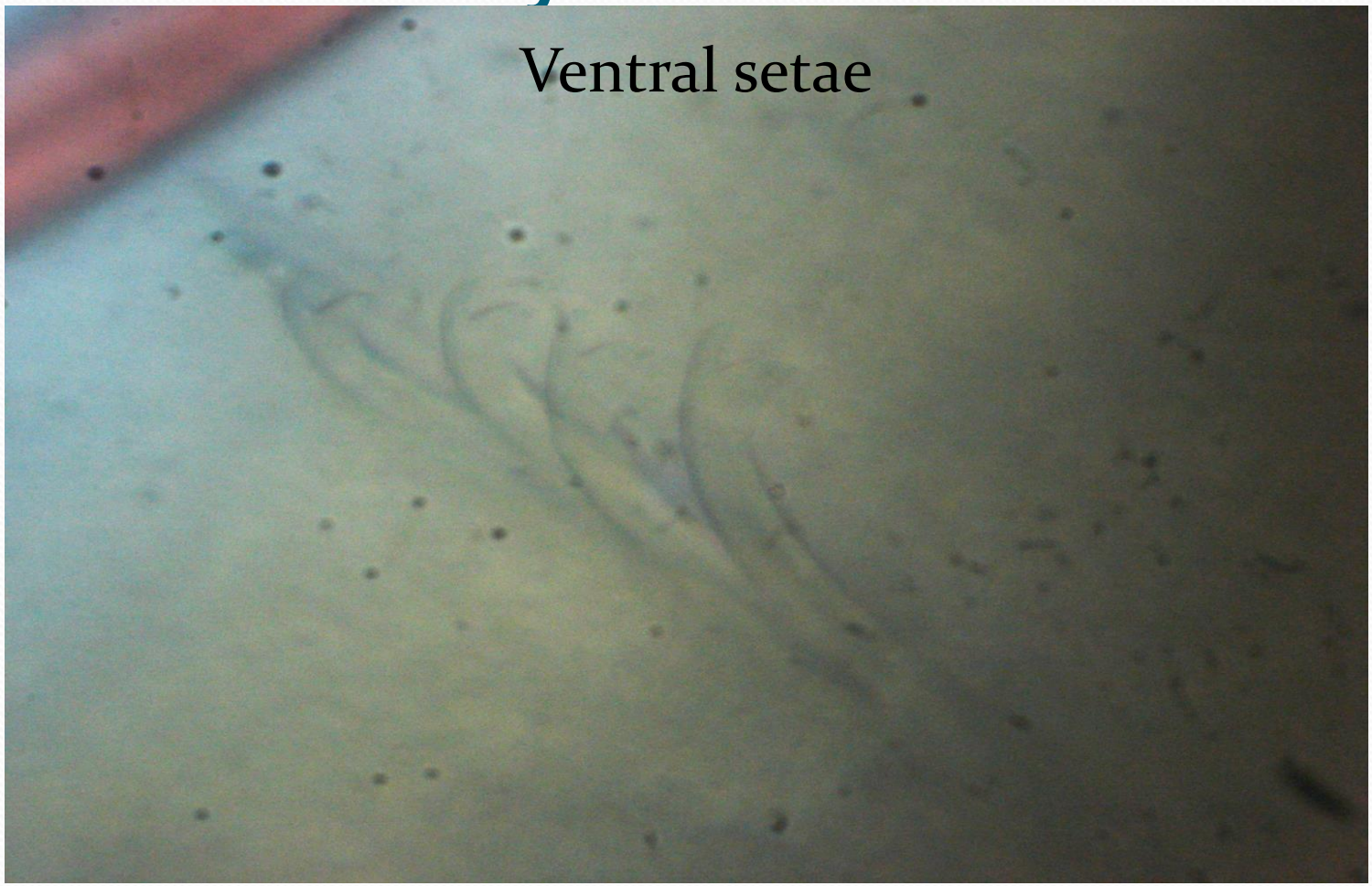


P. synclites-ventral nodules

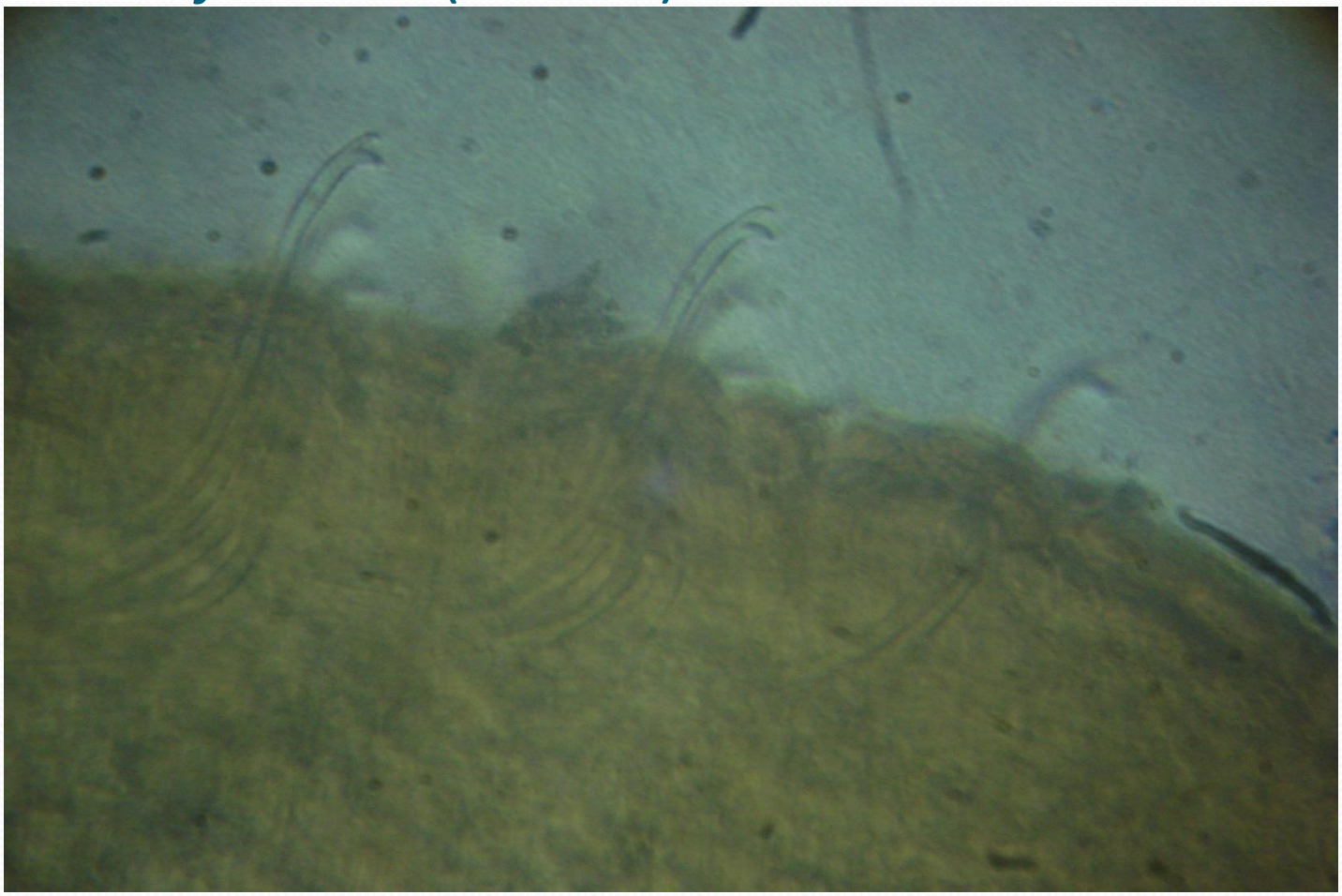
Pristinella jenkinae


P. jenkinae-dorsal
P. jenkinae-ventral

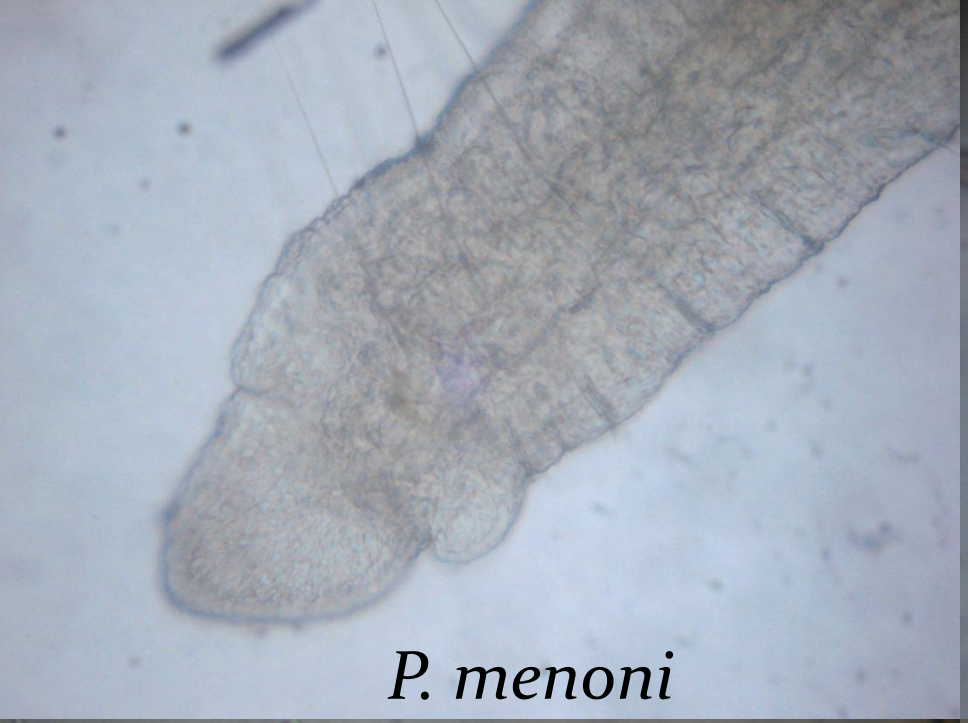
Pristinella jenkinae



P. jenkinae(ventral)

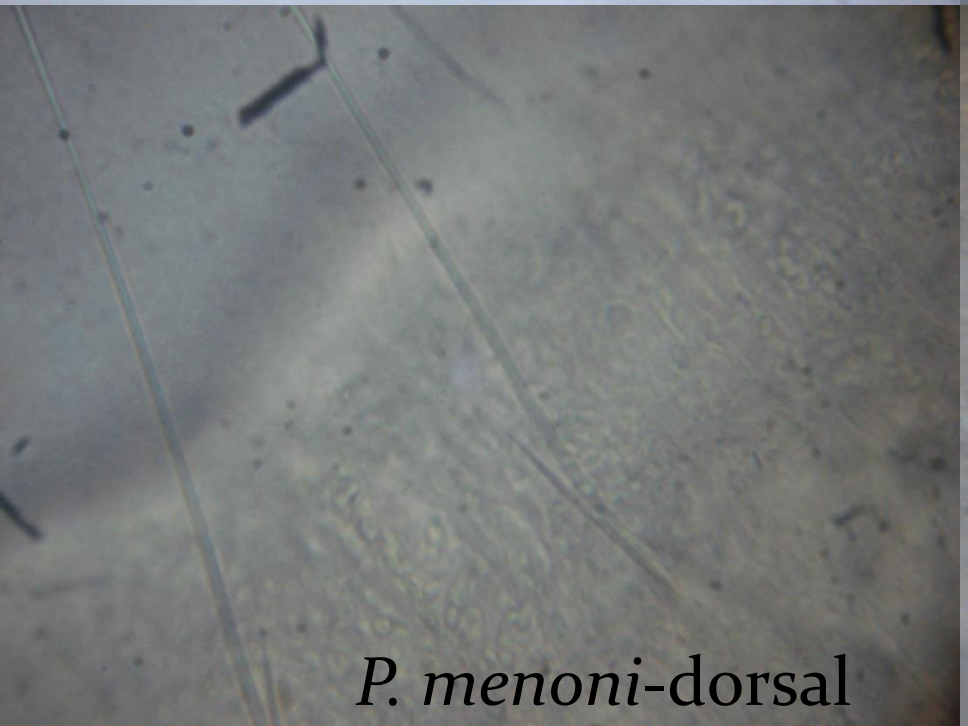


Pristinella menoni

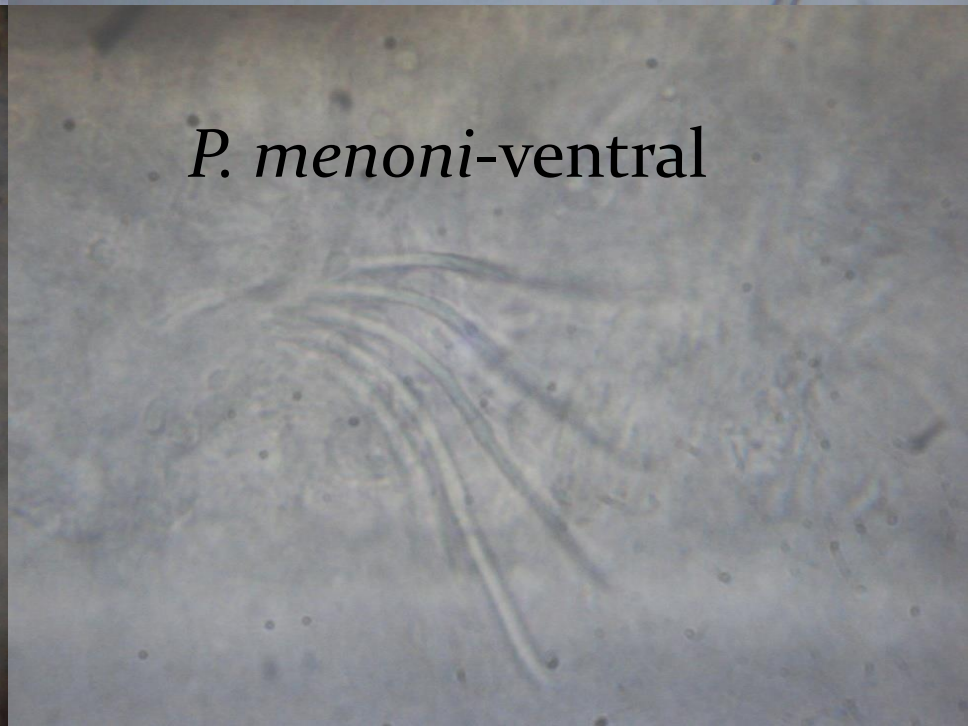


P. menoni

P. menoni-posterior

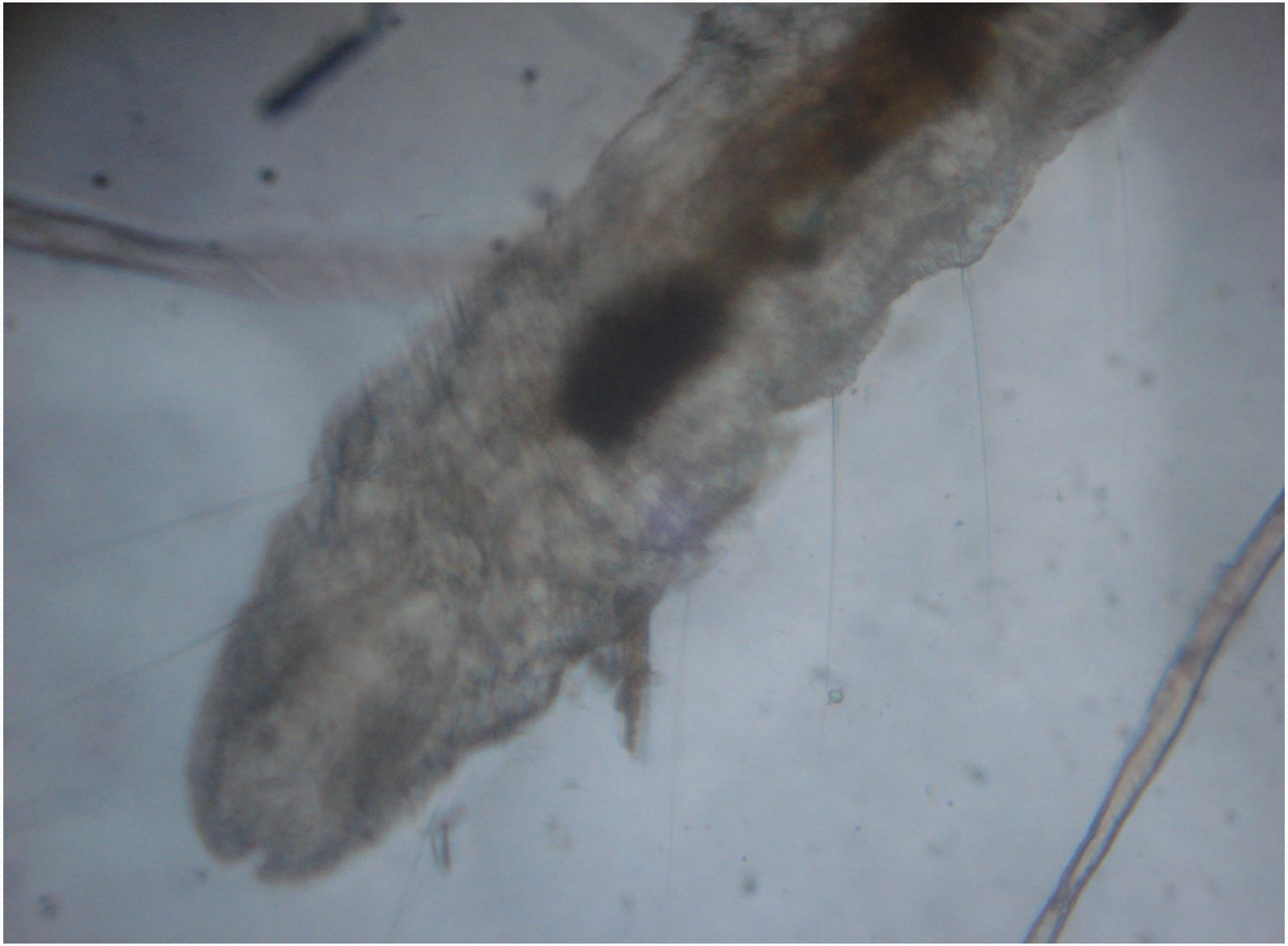


P. menoni-dorsal

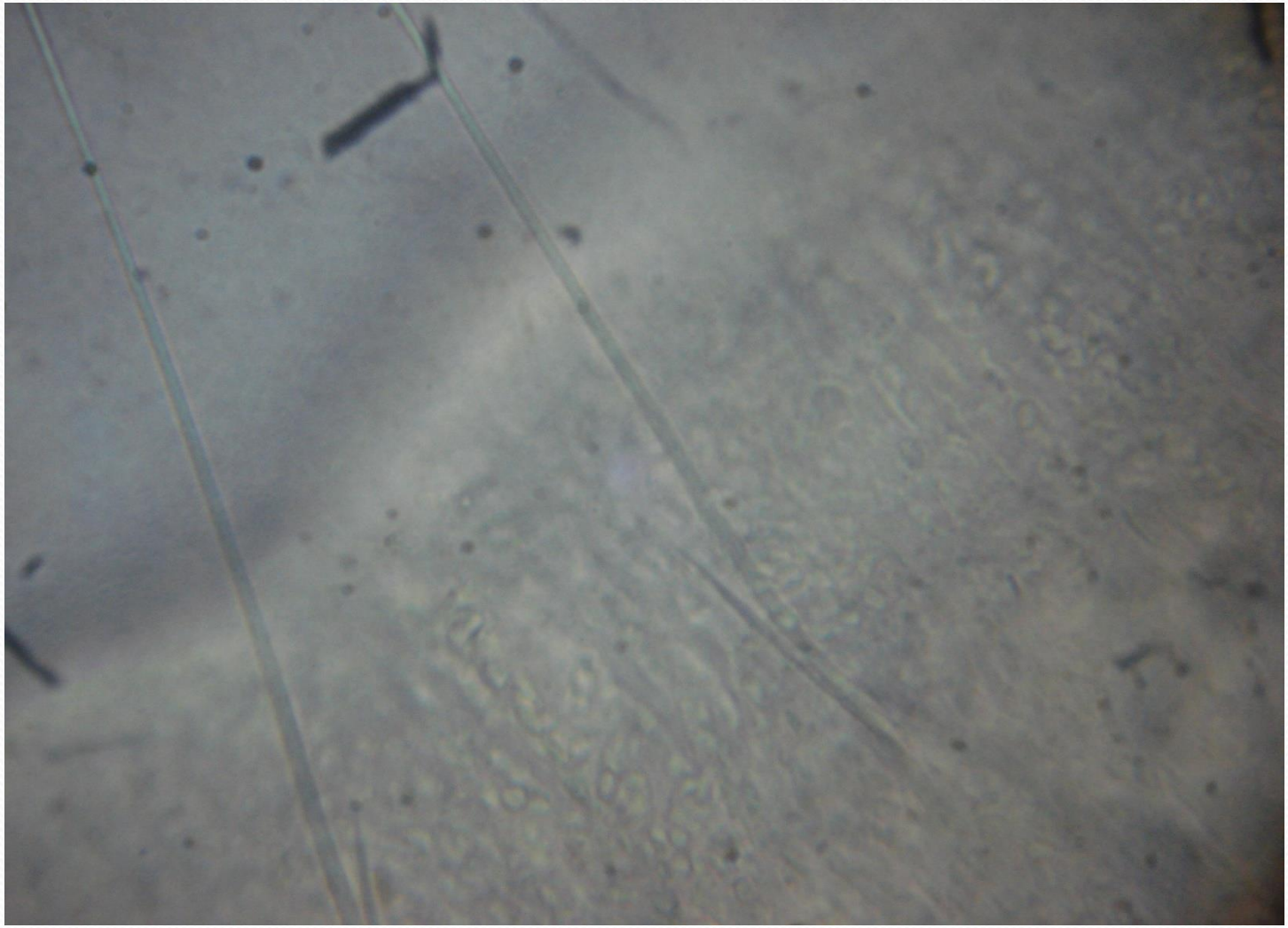


P. menoni-ventral

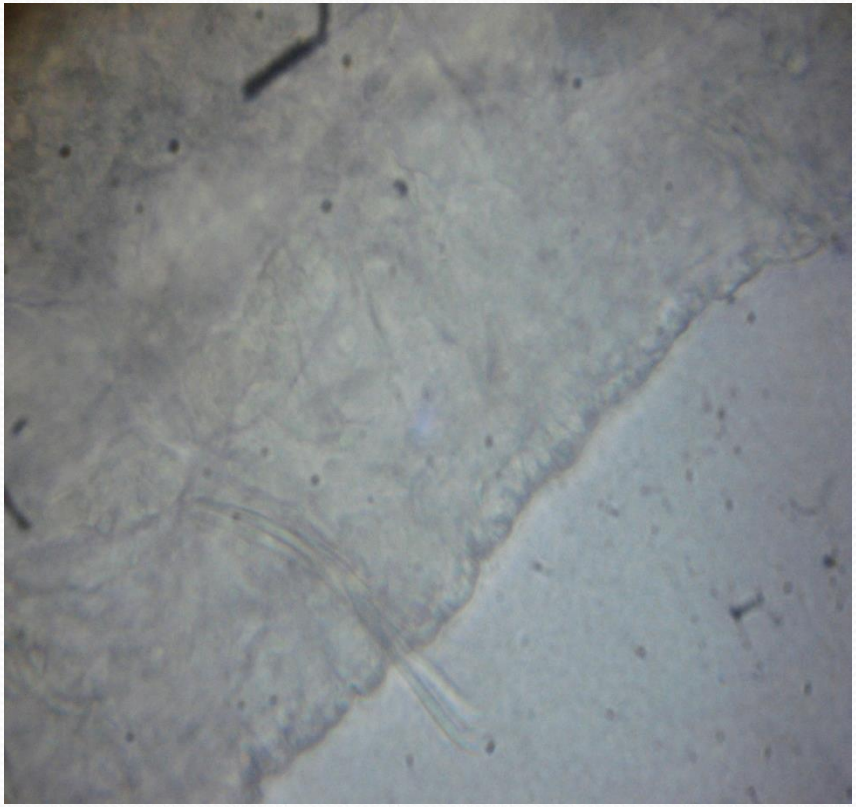
Pristinella menoni

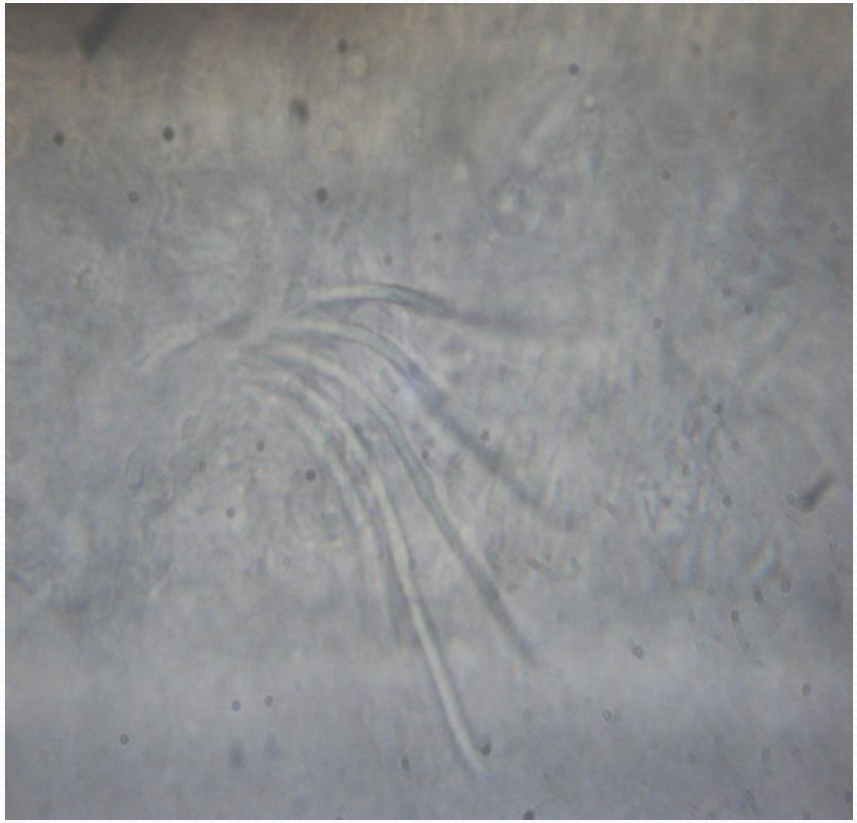


Pristinella menoni

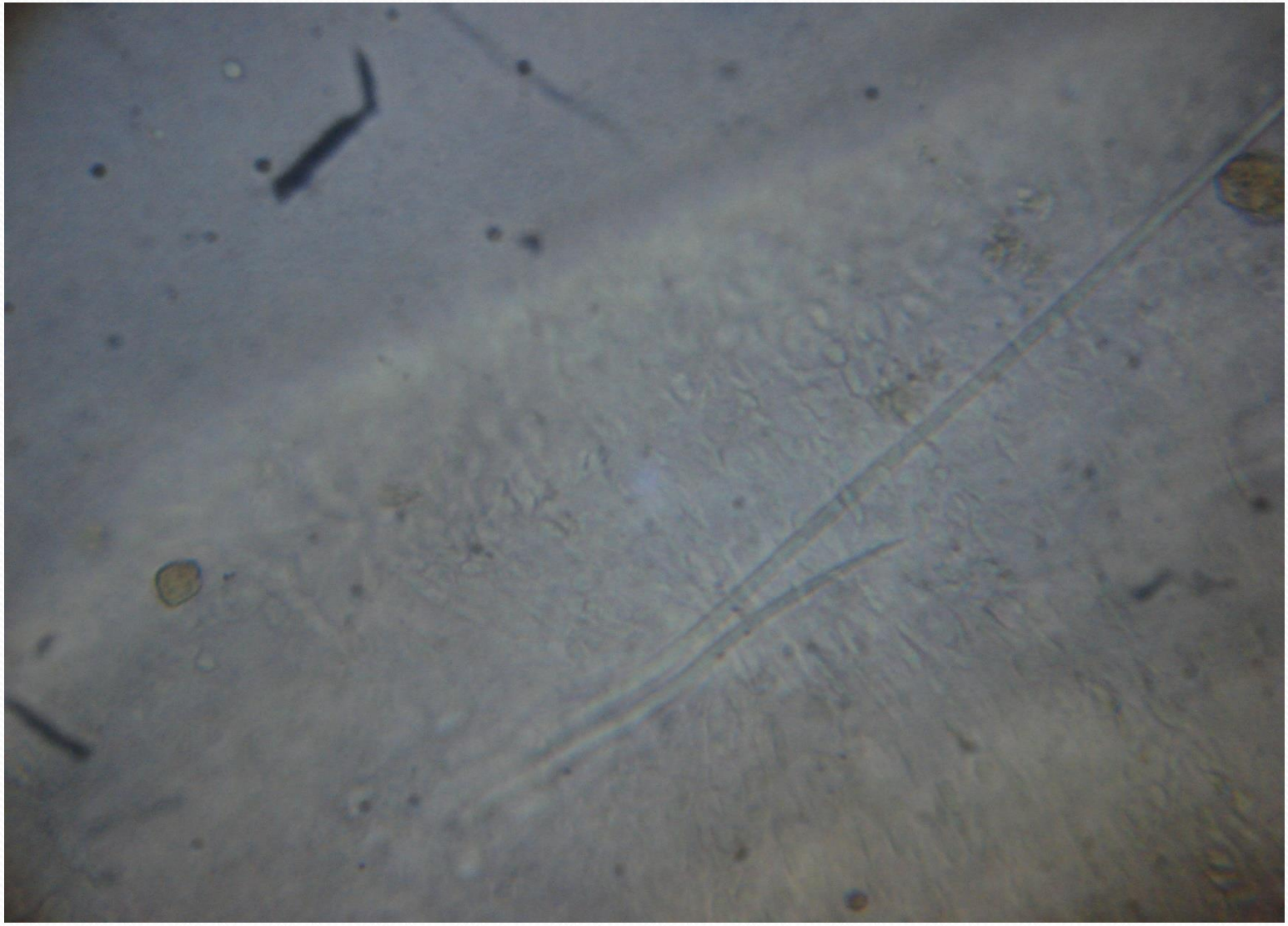


Pristinella menoni

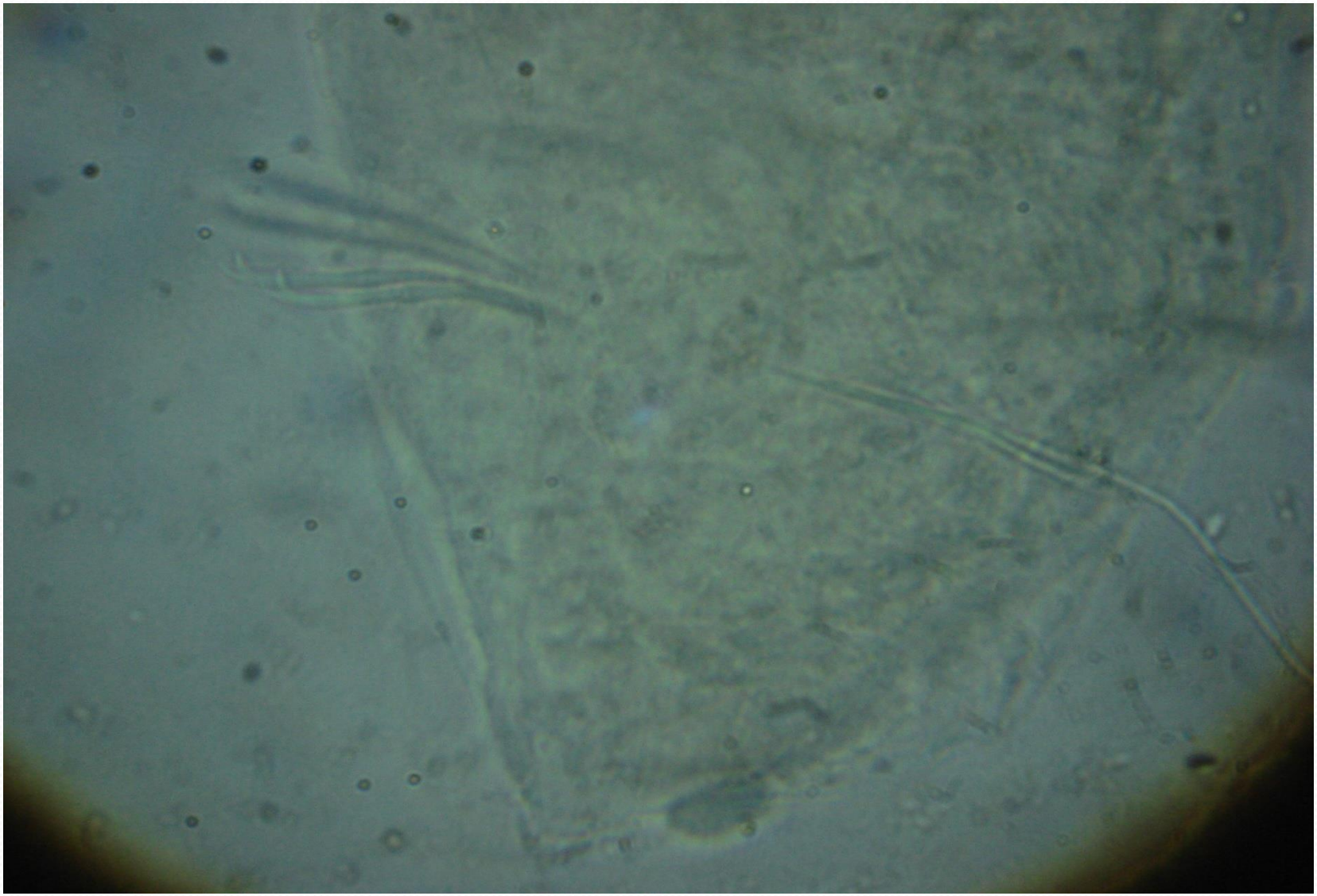




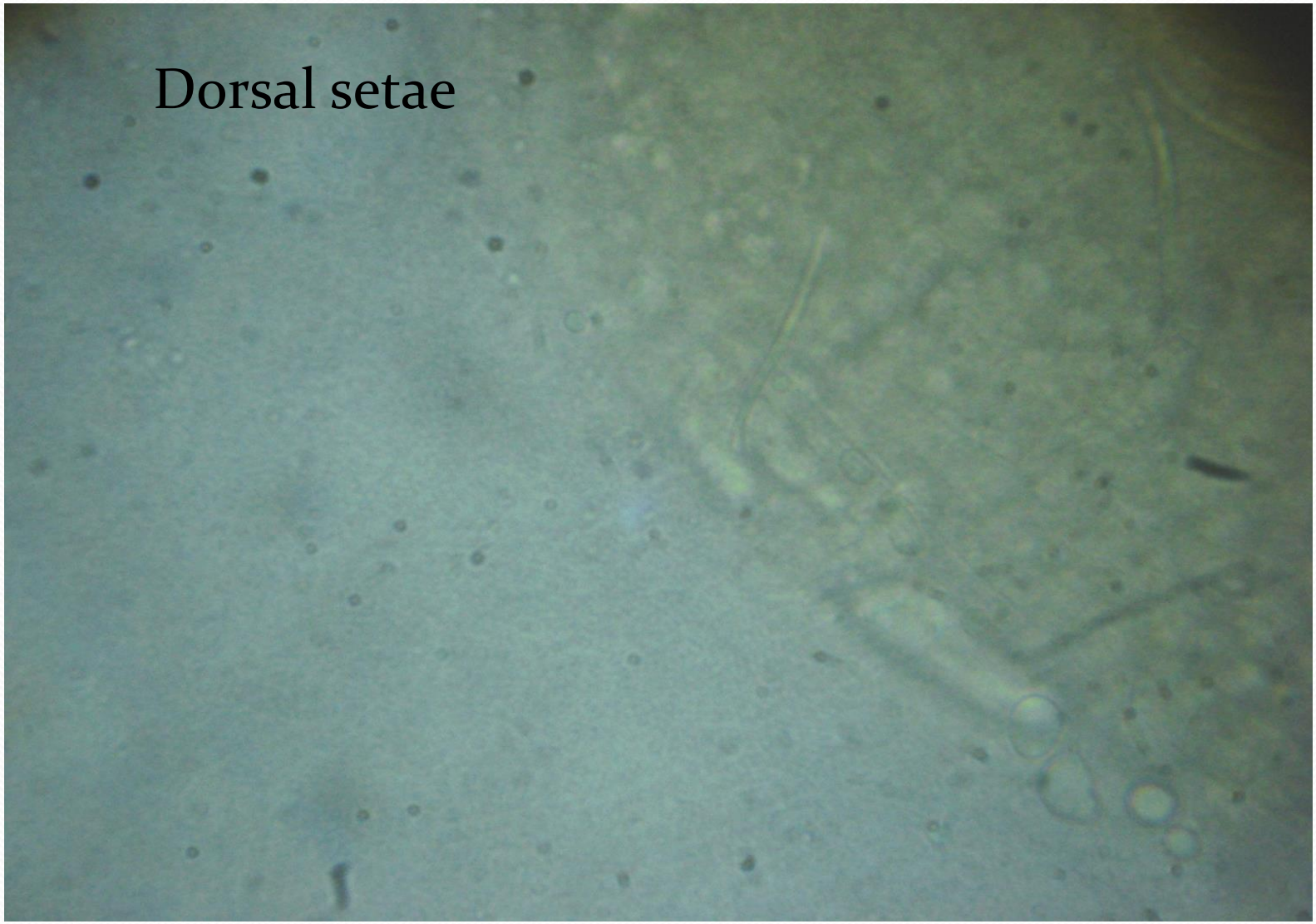
Pristinella menoni



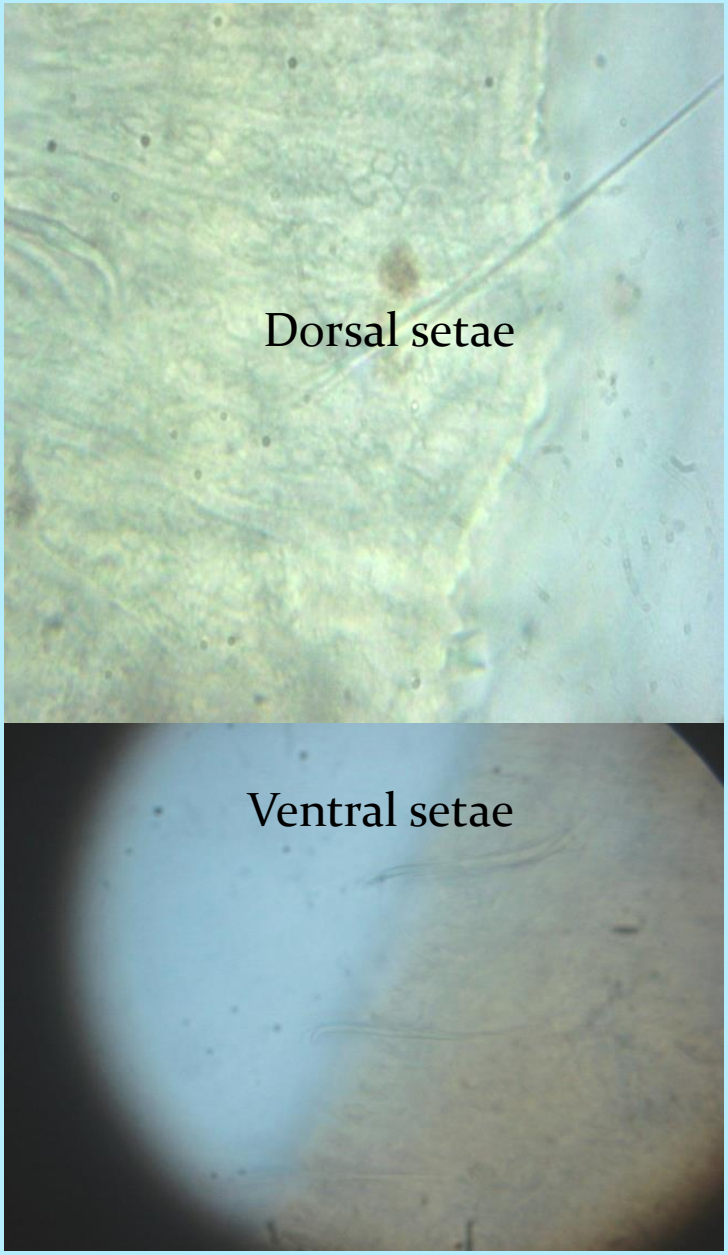
Pristina breviseta



Pristina breviseta



Nais barbata



- First 7 ventrals have long upper and small lower tooth
- Needle seta is short and pointed
- Dorsal from VI with one hair and one needle


Nais barbata-anterior


Nais barbata-posterior

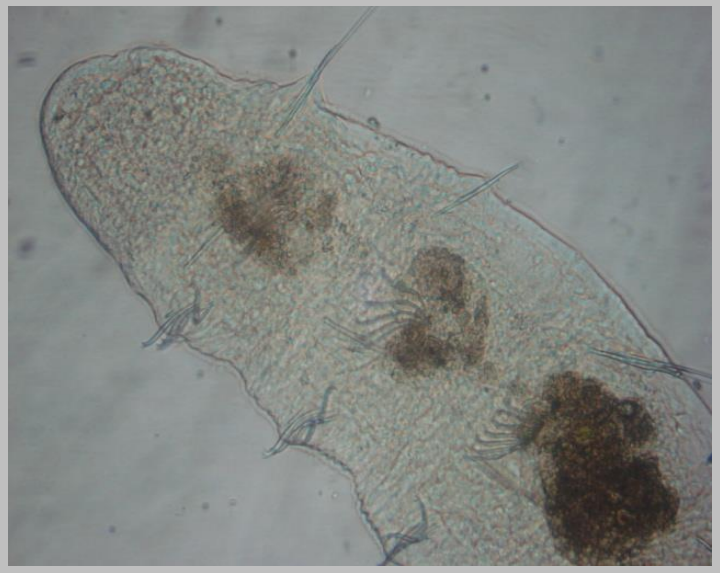

Nais barbata-dorsal


Nais barbata-ventral

Nais barbata

Anterior region

Posterior region

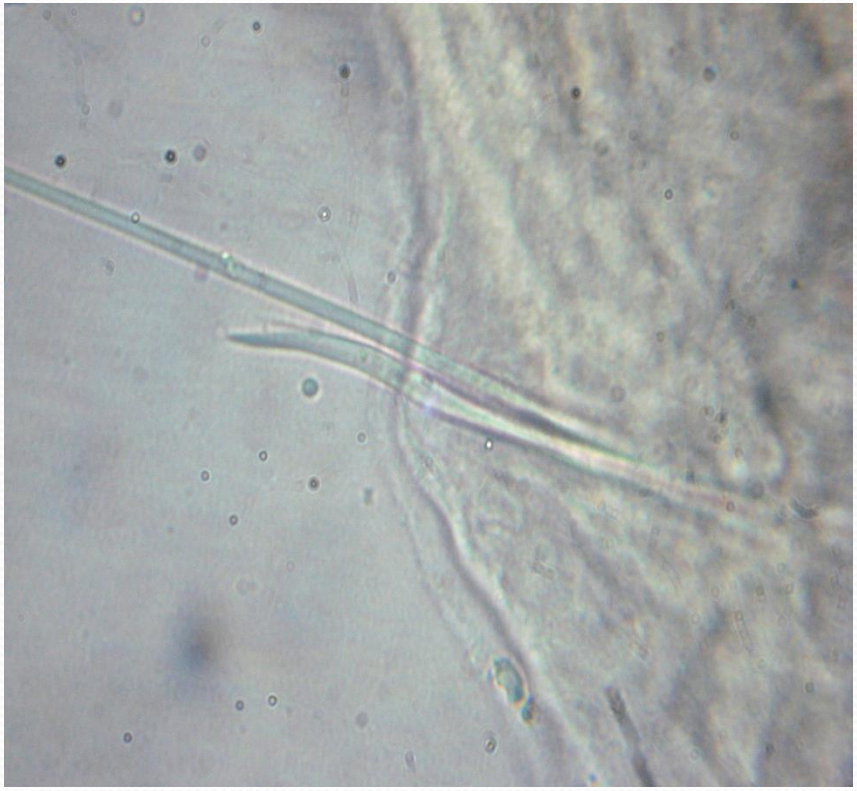


Allonais paraguayensis

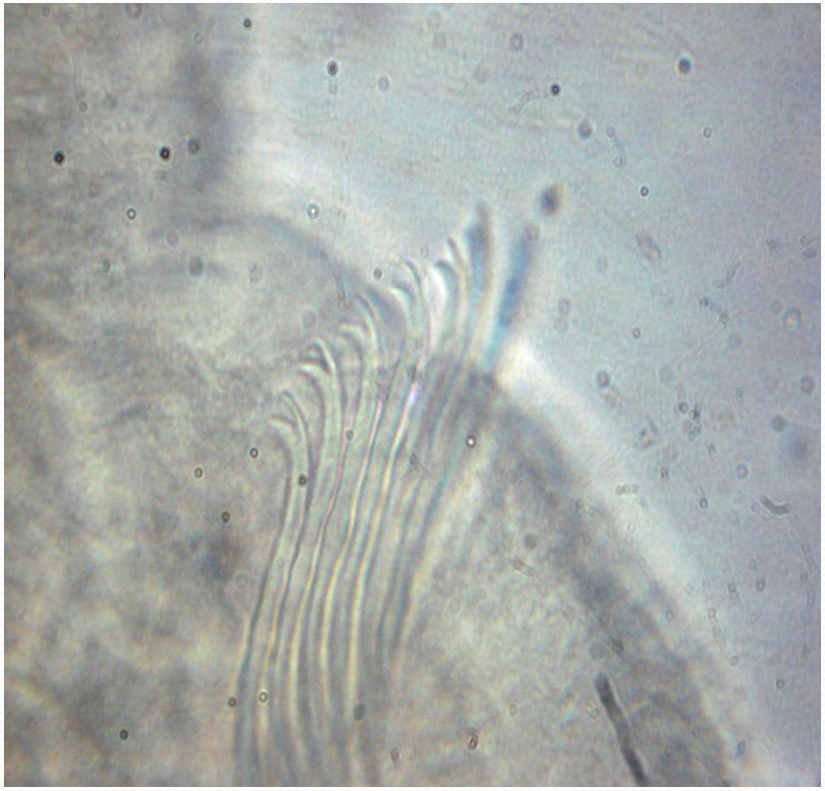
- Needle setae with distal tooth rudimentary or shorter than proximal.
- Dorsal setae from VI segment
- ventral-5-6 with slightly longer upper tooth at anterior and equal at posterior

Allonais paraguayensis

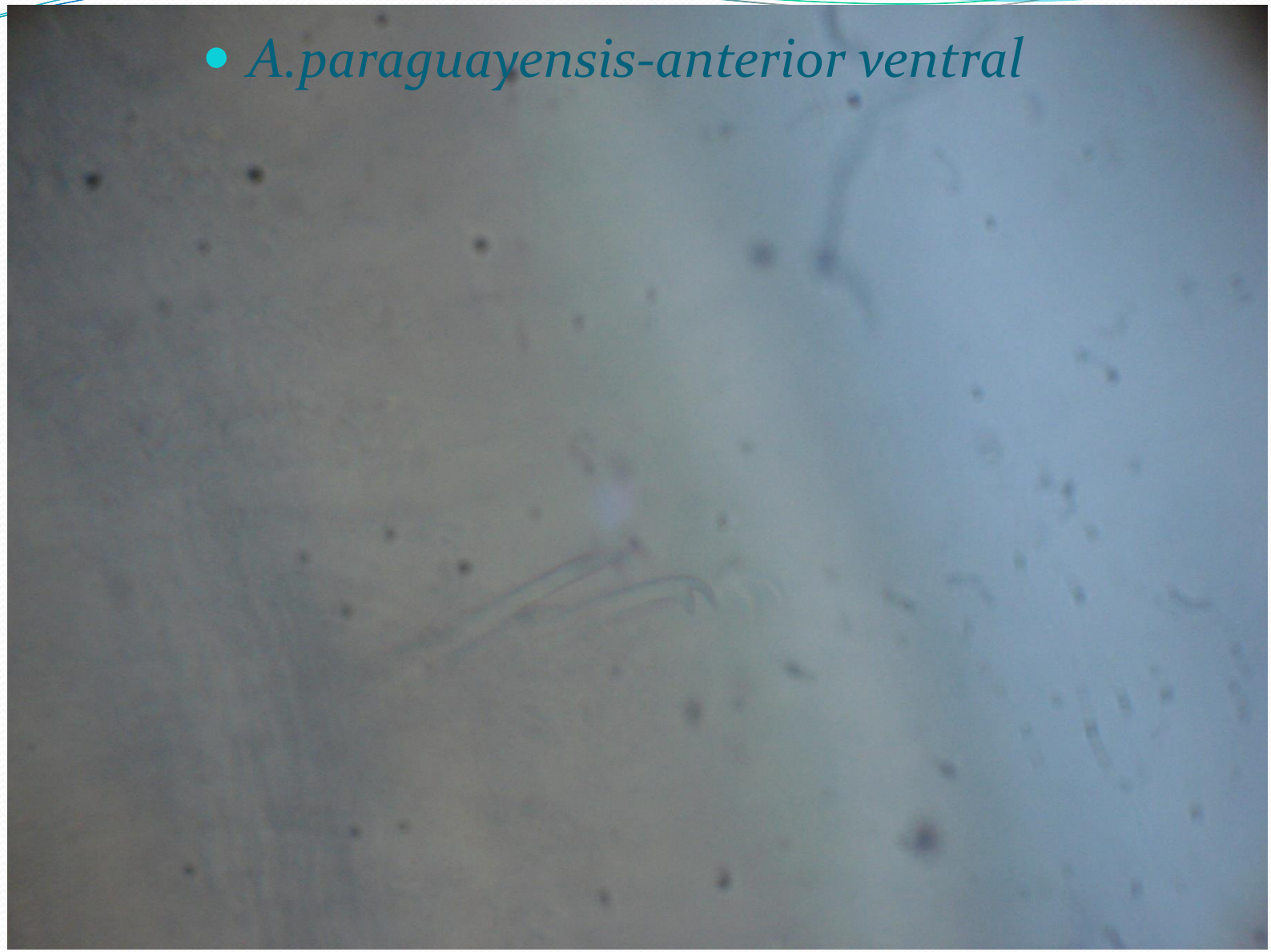
Needle setae



Ventral setae

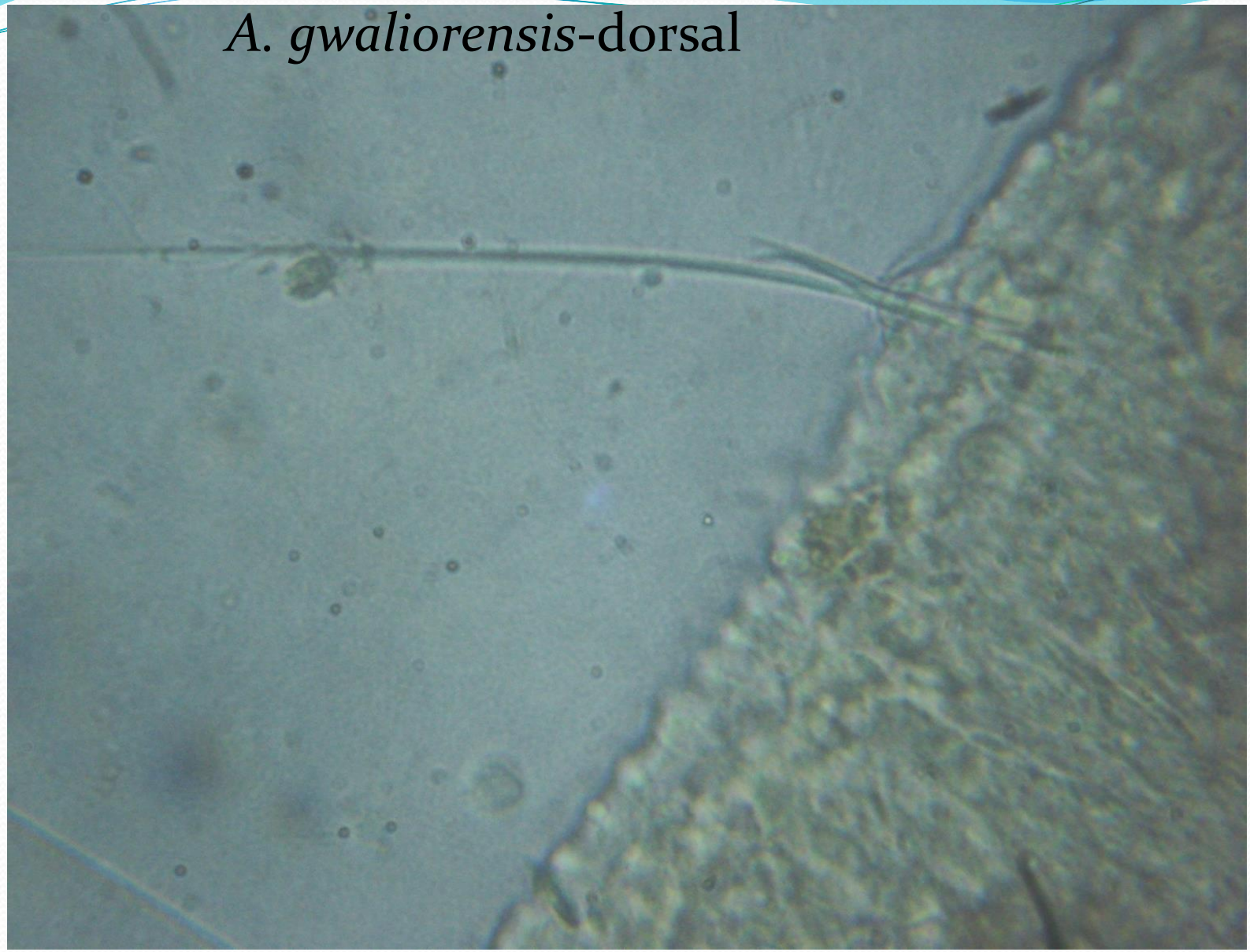


- *A.paraguayensis-anterior ventral*

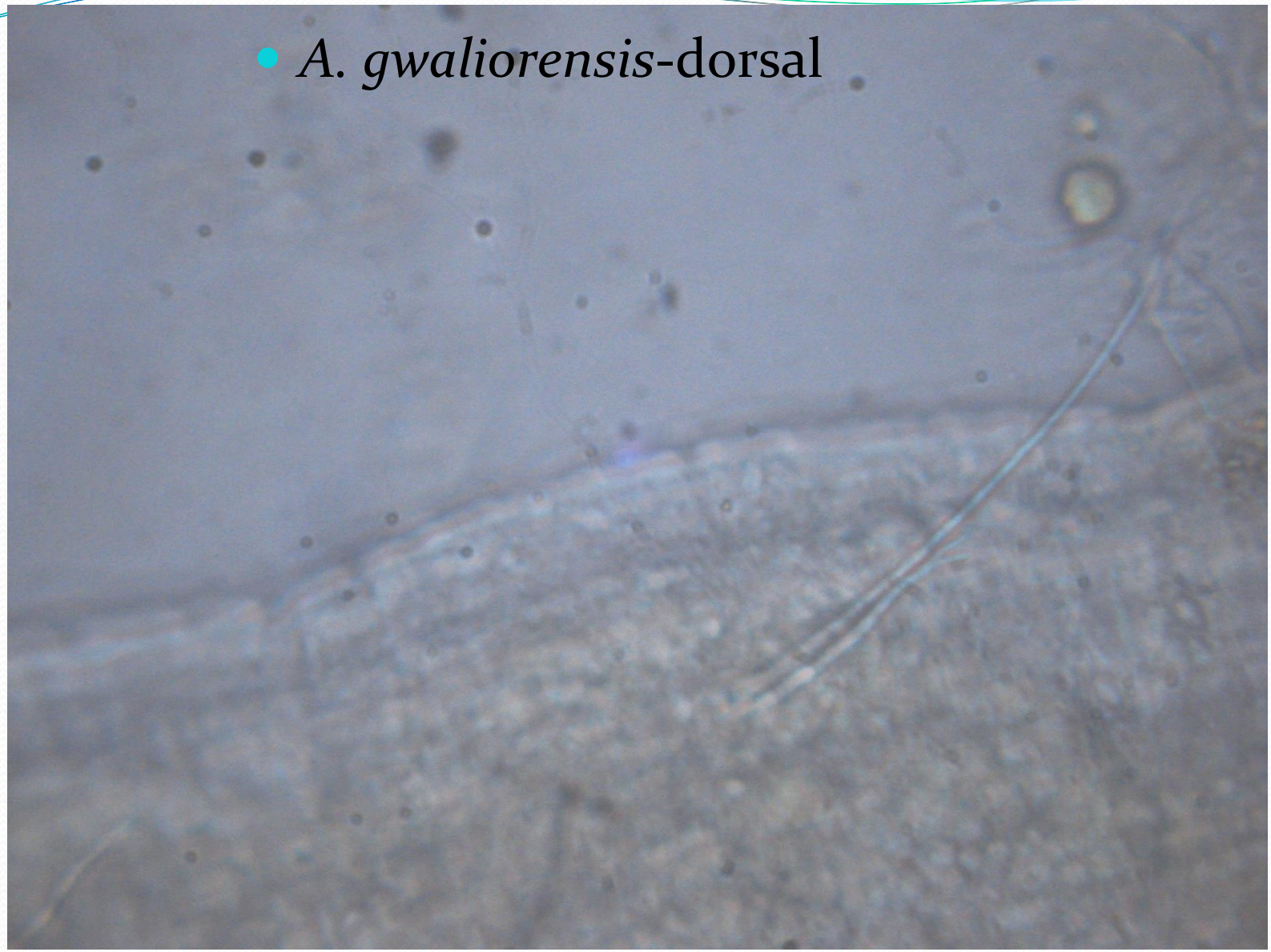


Allonais gwaliorensis

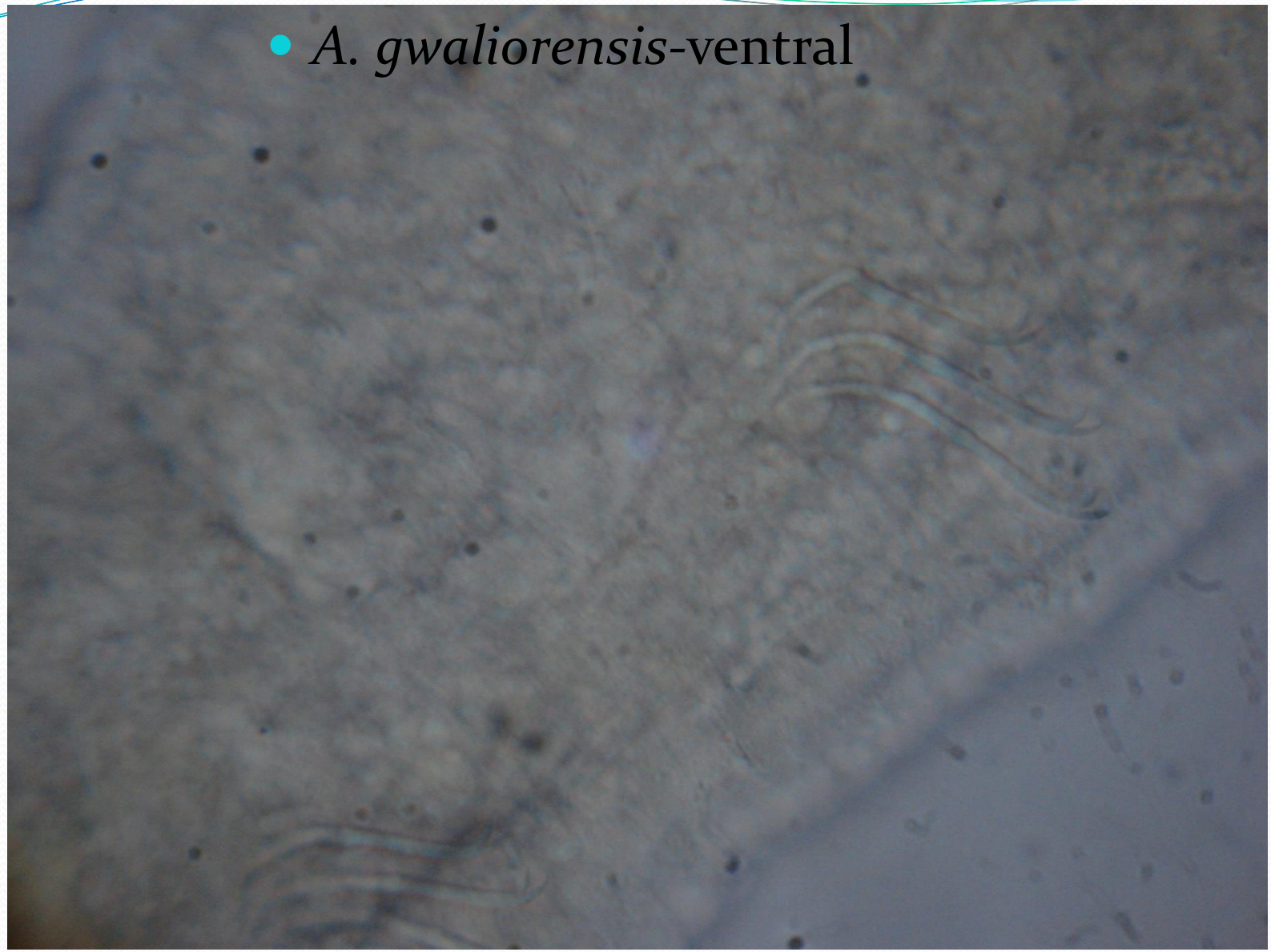
A. gwaliorensis-dorsal



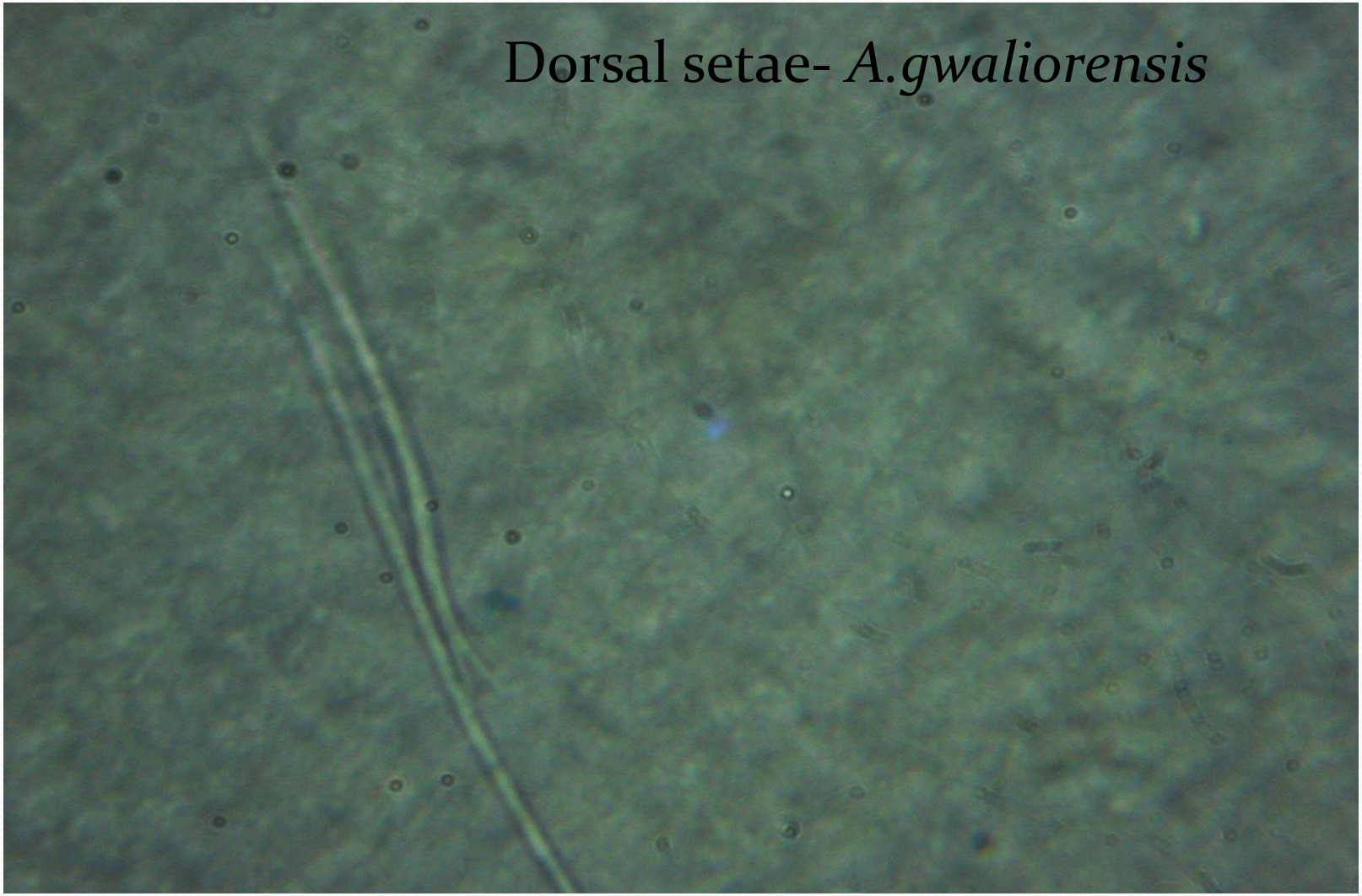
- *A. gwaliorensis*-dorsal



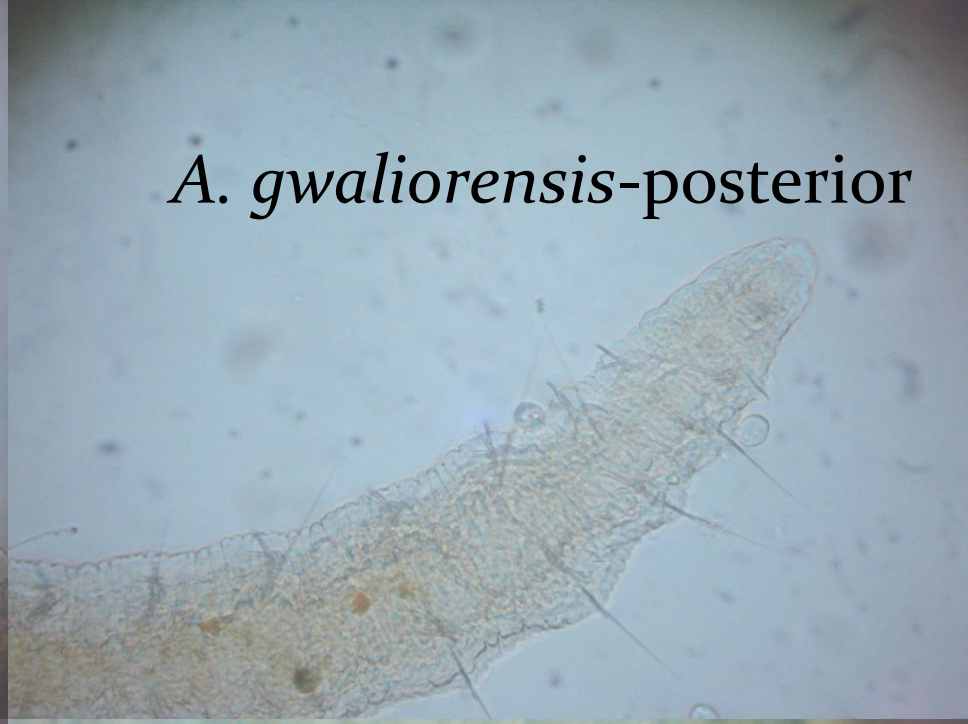
- *A. gwaliorensis*-ventral



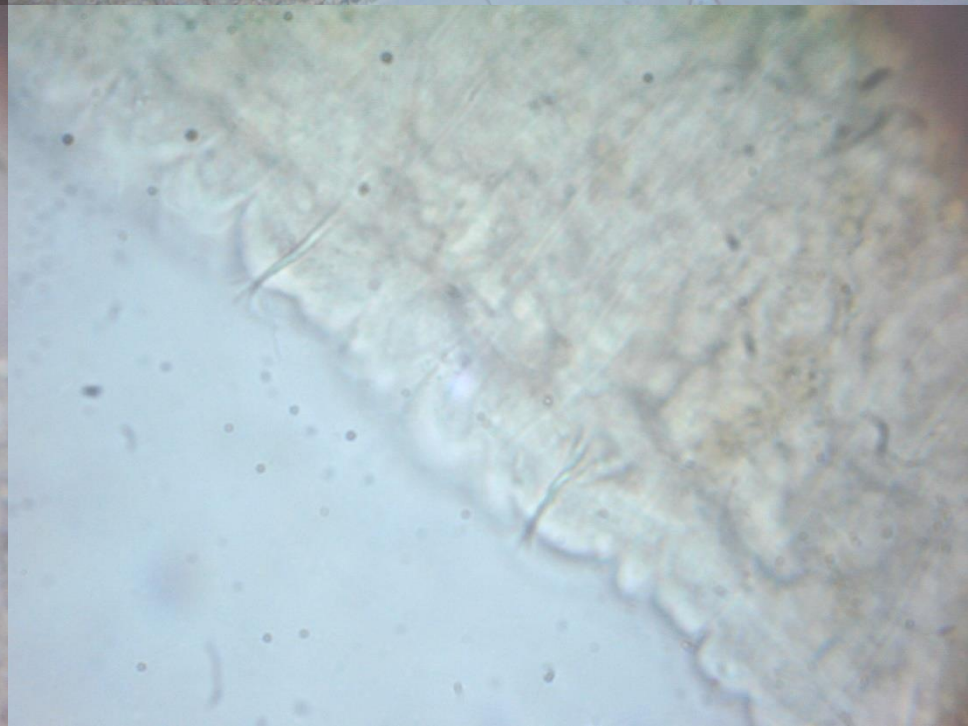
A. gwaliorensis



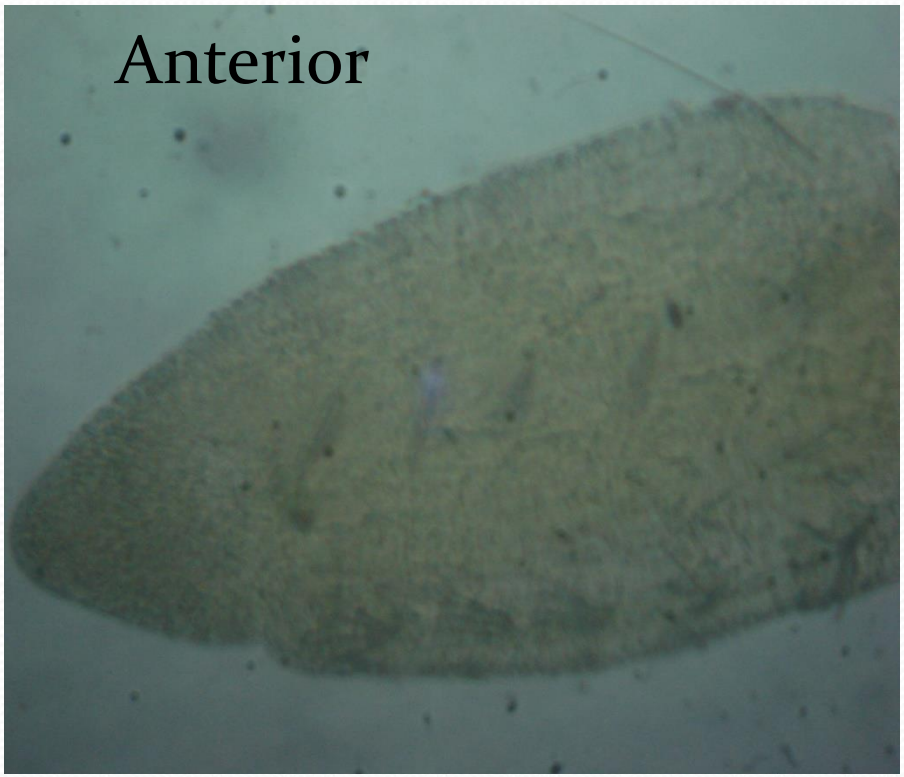

A.gwaliorensis-anterior


A. gwaliorensis-posterior

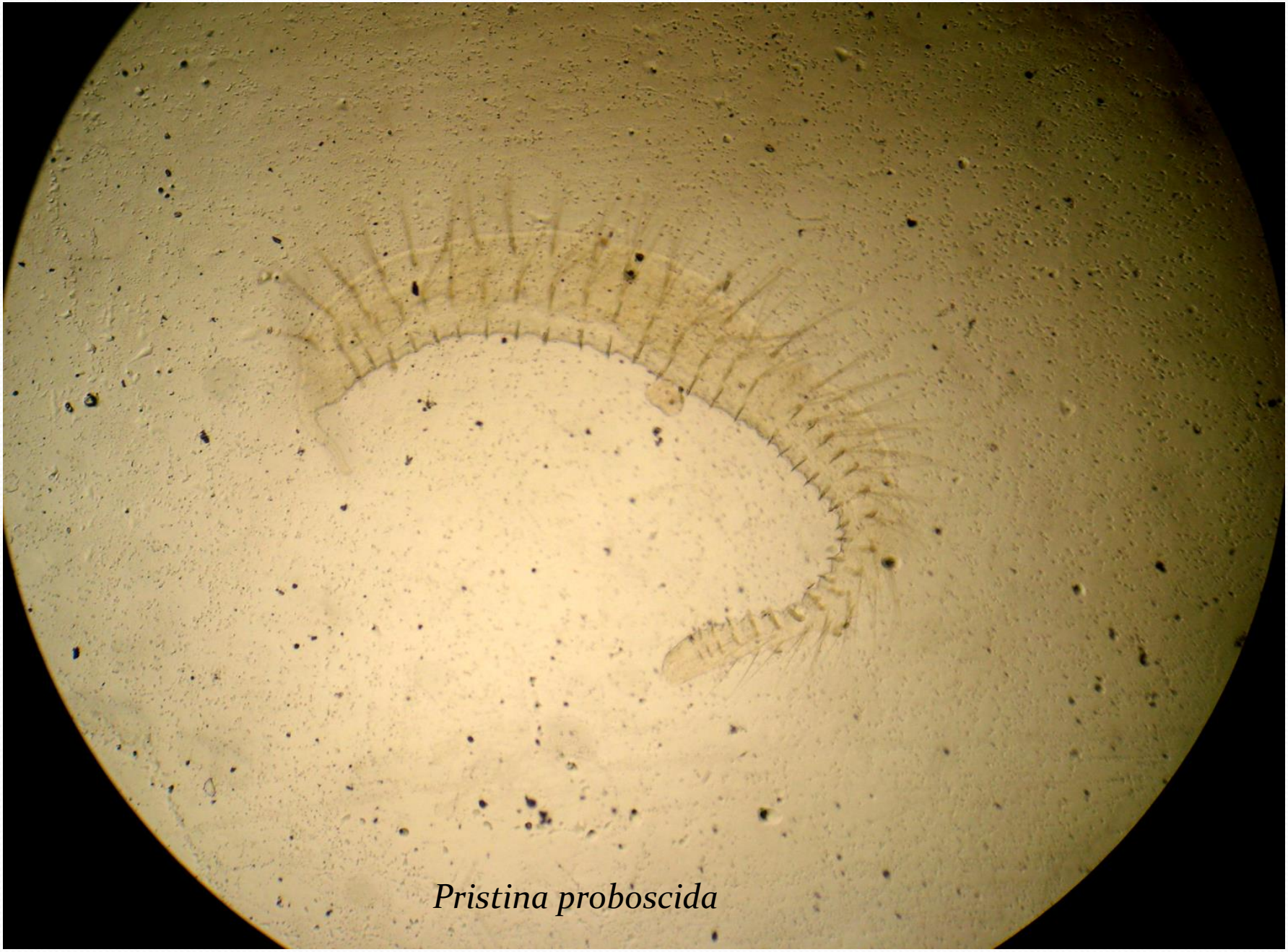

A. gwaliorensis-ventral



Allonais gwaliorensis



- *A.gwaliorensis*

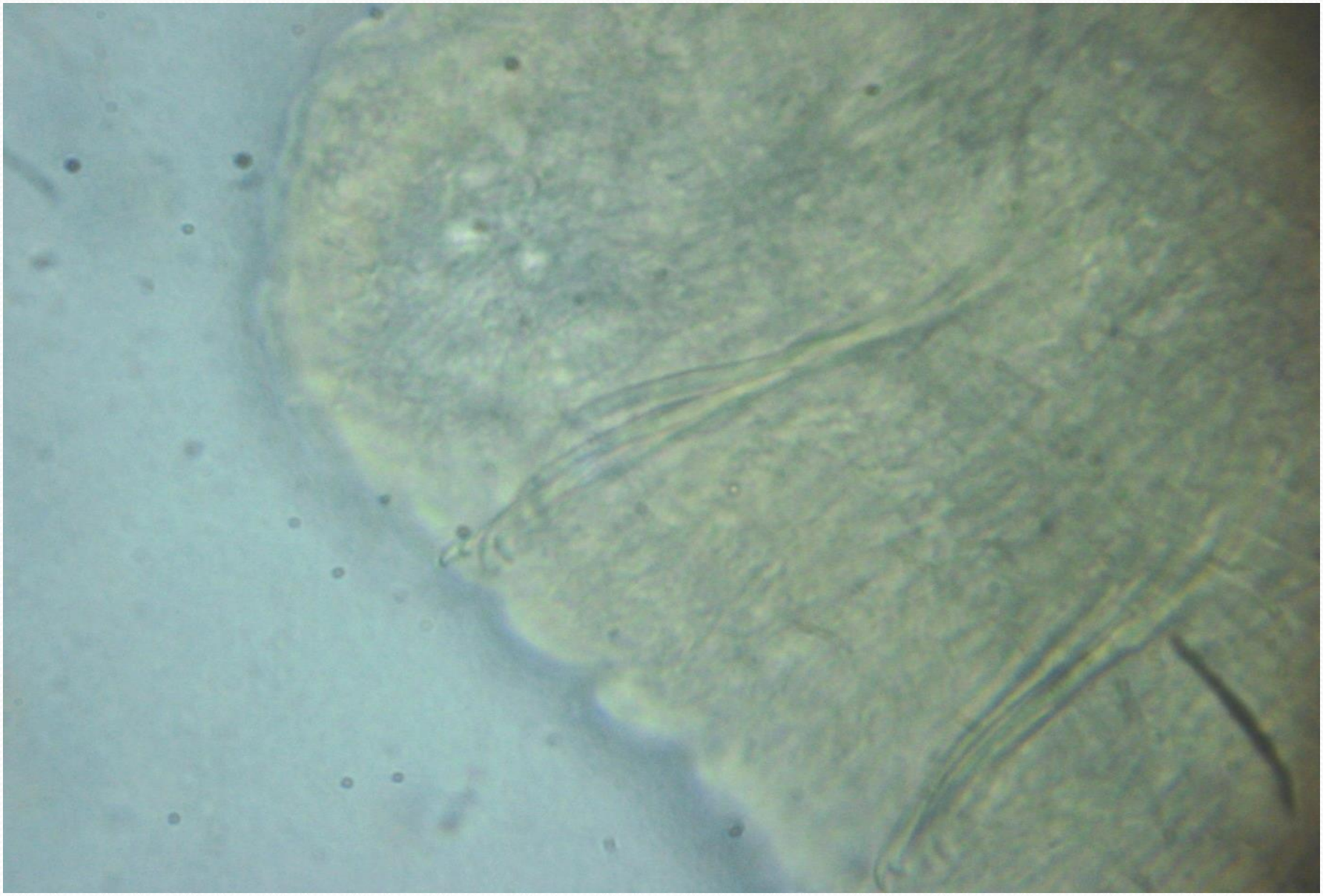


Pristina proboscida

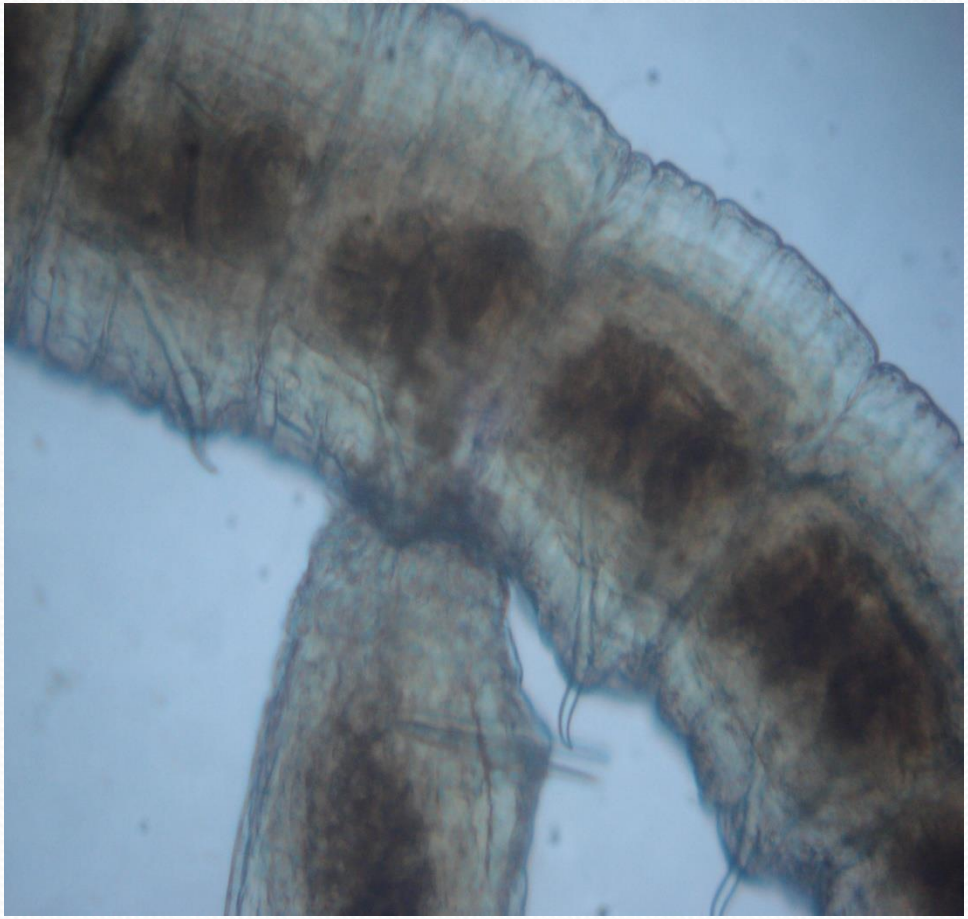
Aulophorus moghei

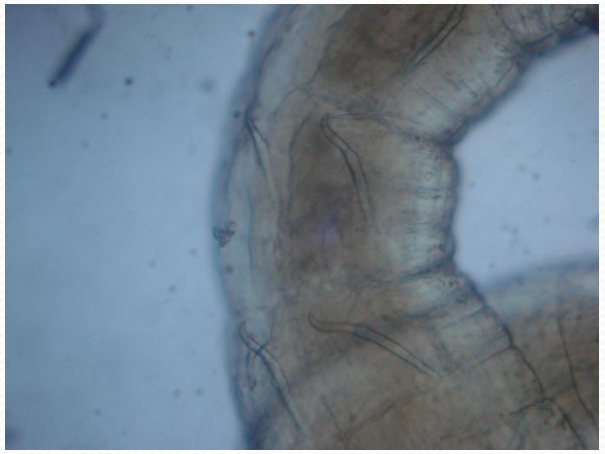
- Dorsal setae from V
- Triangular prostomium
- Four to five ventral setae per bundle
- One bayonet shaped hair setae

Aulophorus moghei-ventral setae



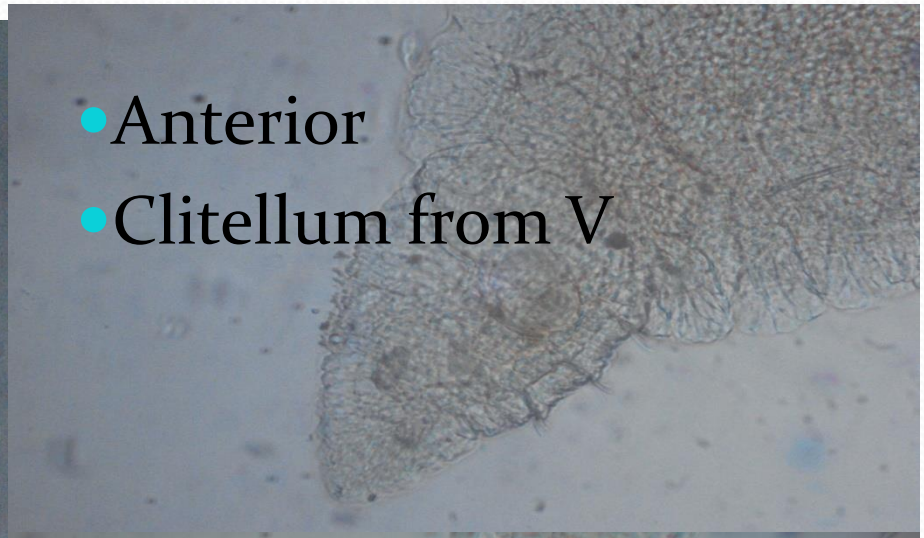
Chaetogaster sps



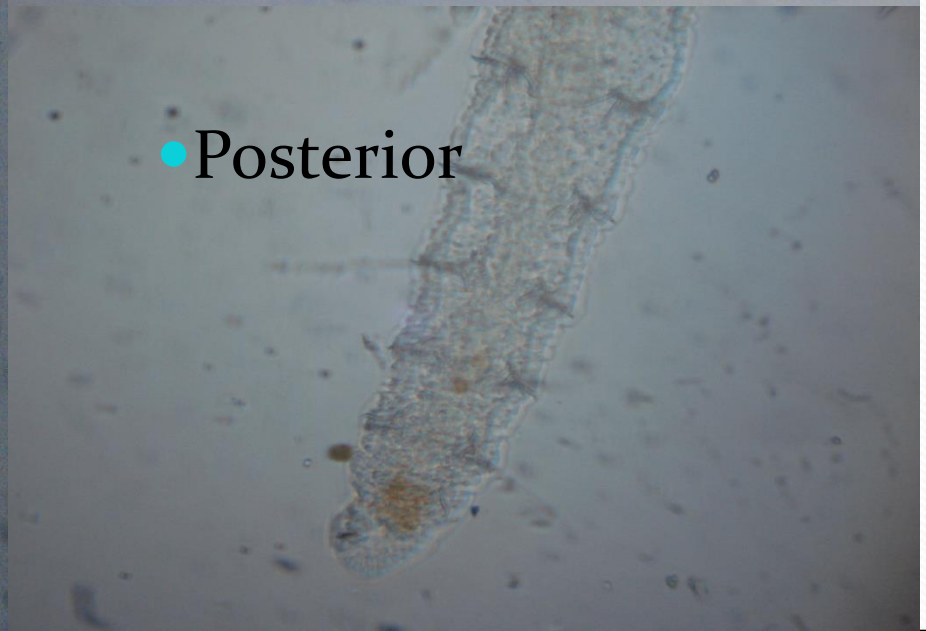


Nais elinguis

- Dorsal setae

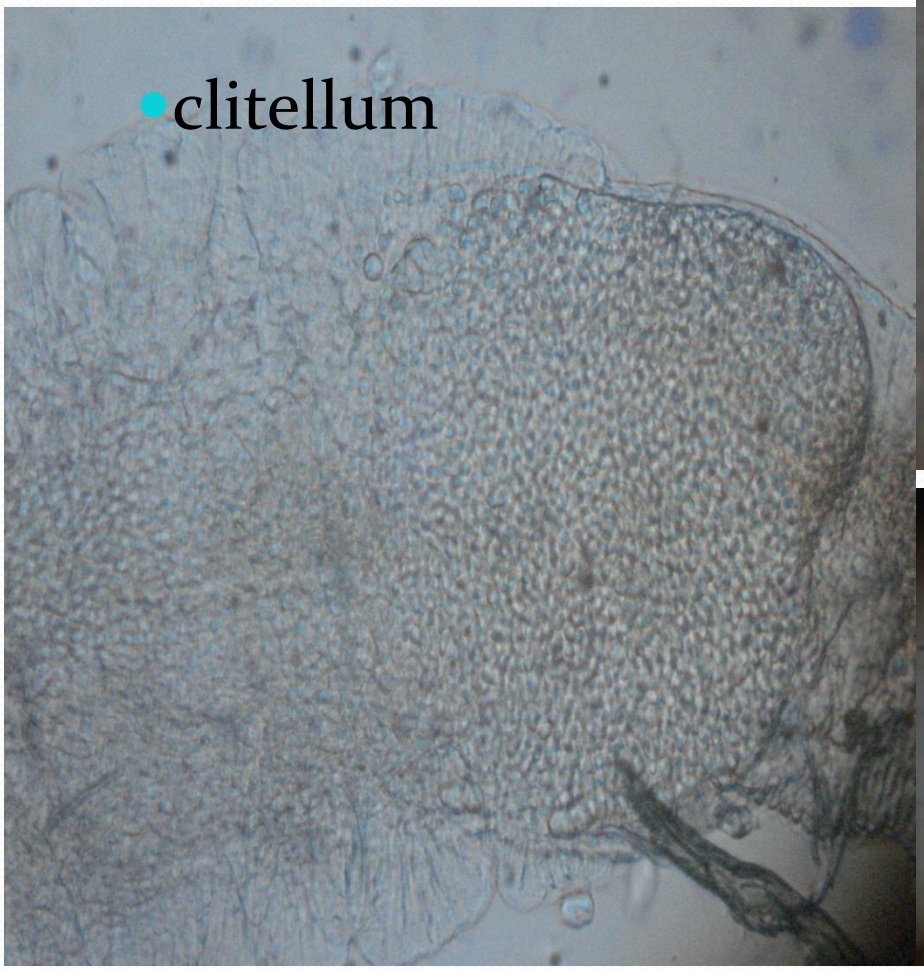


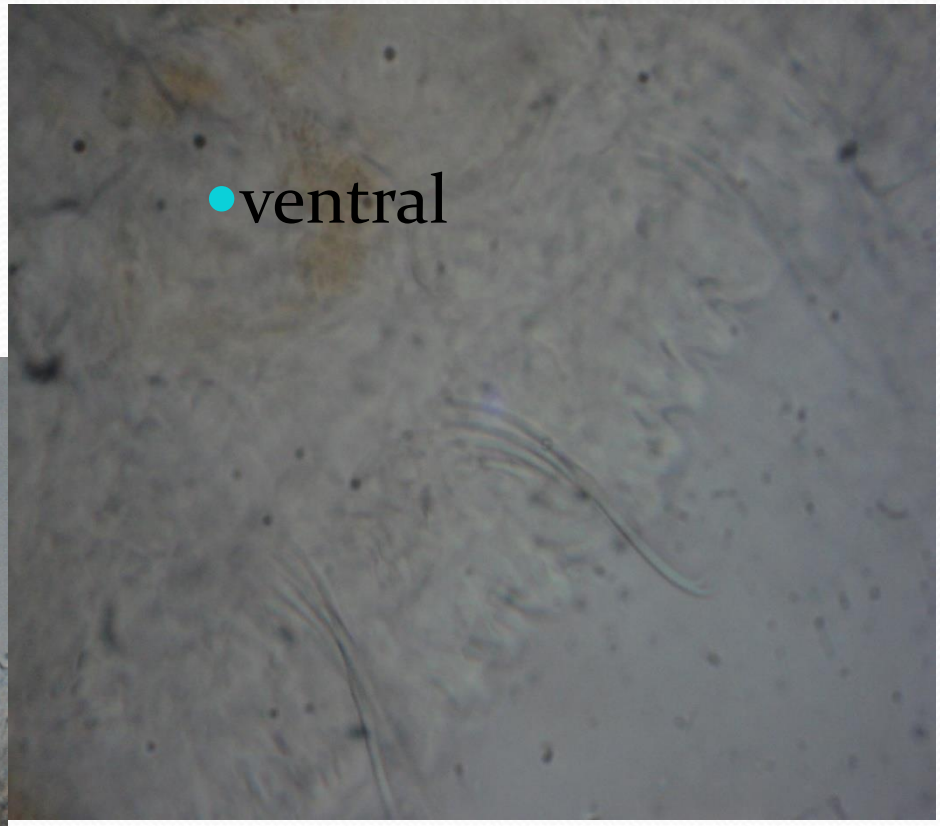
- Anterior
- Clitellum from V



- Posterior

Nais elinguis

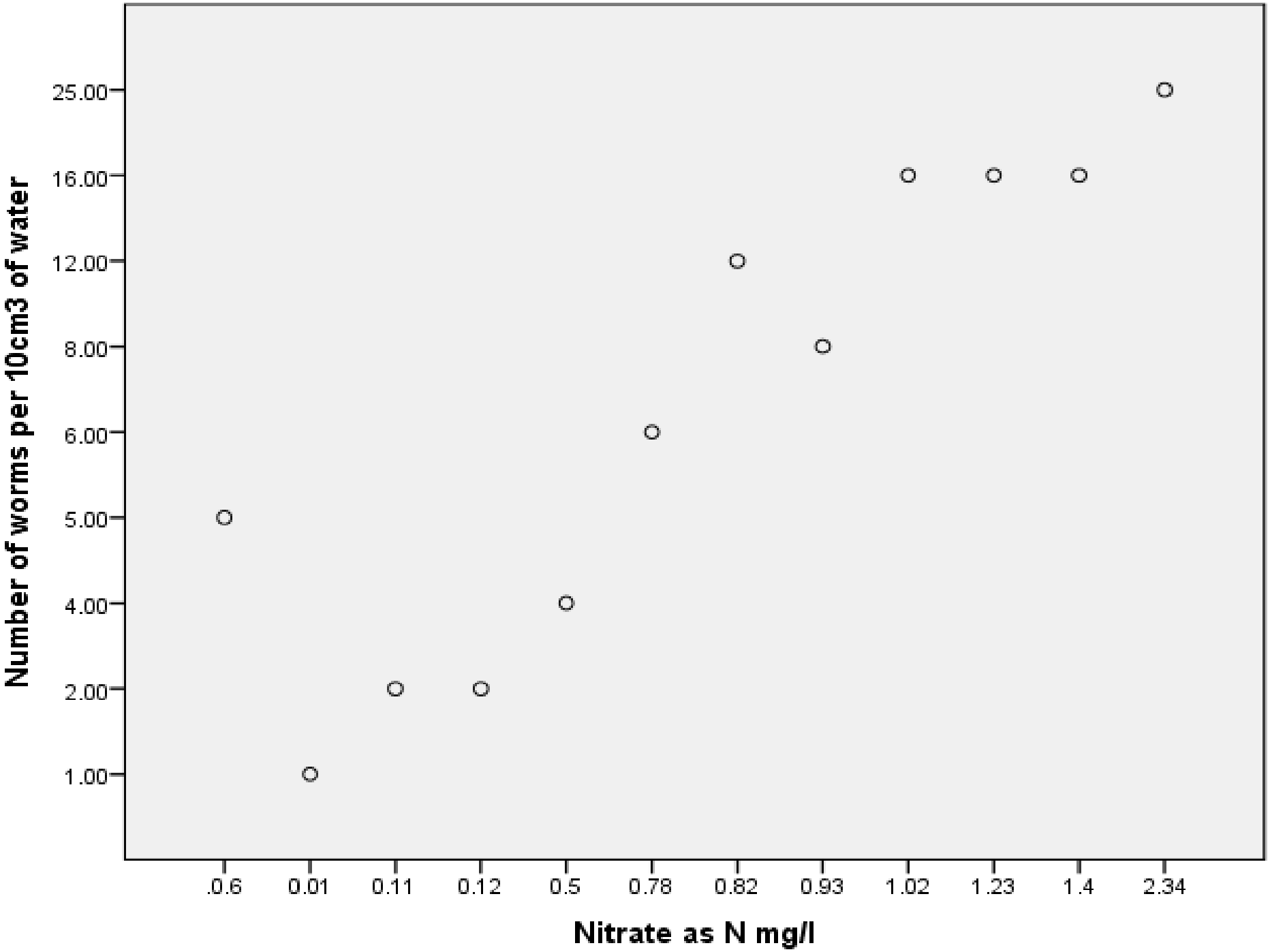


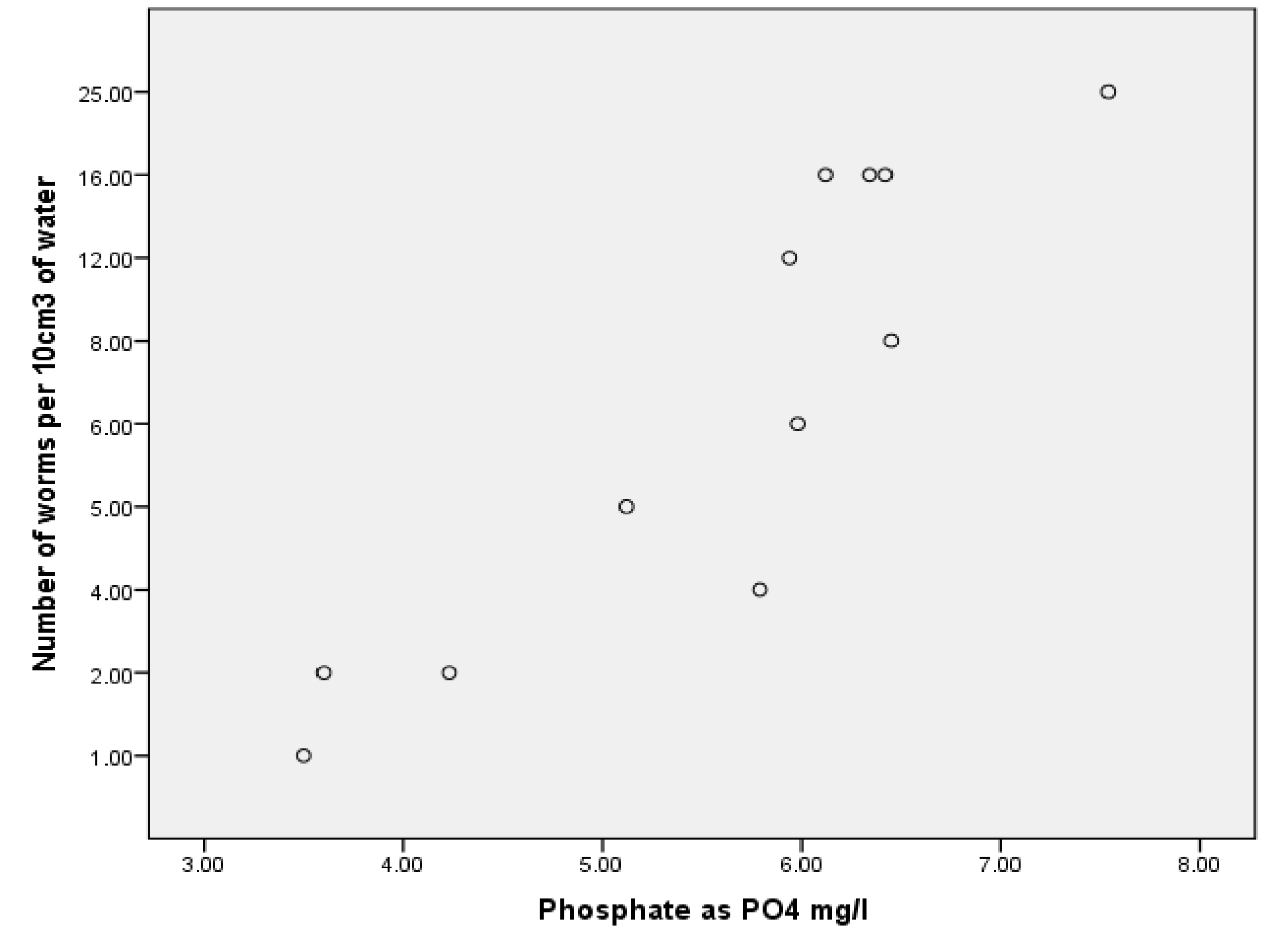


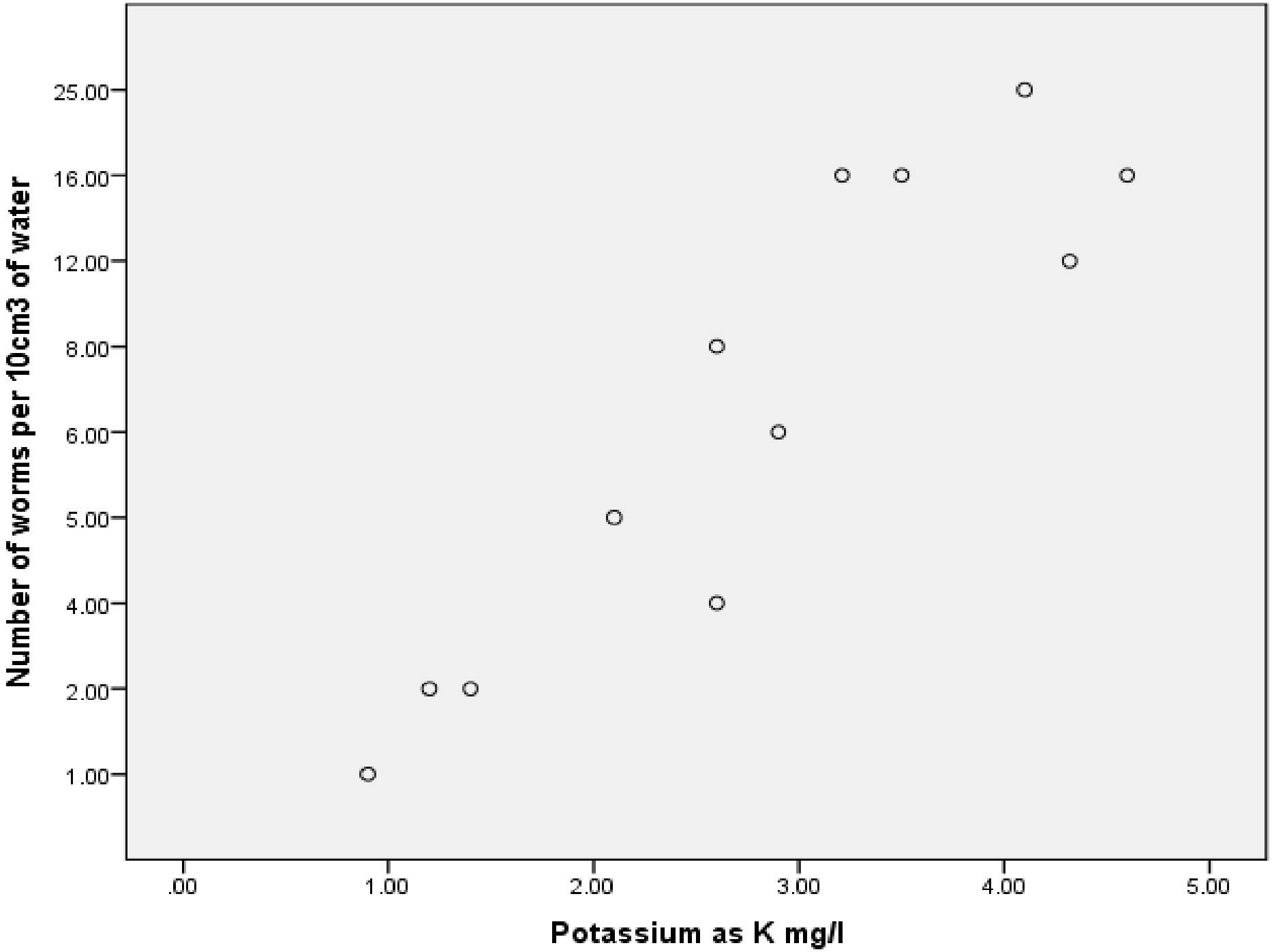
Water quality analysis

BDL=Below detection limit

Sl.no	Parameter	Sample 1 (Wetland-Karkala)	Sample-2 (Anekere-Karkala)	S01 (Agumbe)	S02 (Ananthpura)	R01 (Anekere)
1	Nitrate (N) mg/l	0.12	0.13	0.14	0.38	0.11
2	Phosphate (PO4) mg/l	1.44	2.98	BDL	4.72	0.56
3	Pottasium (K) mg/l	0.9	0.9	0.6	5	1.3
4	Calcium (Ca) mg/l	2.1	3.6	2.6	12	2.5
5	Magnesium (Mg) mg/l	1.32	1.70	3.62	2.02	1.26
6	Sodium (Na) mg/l	2.9	1.6	3.4	10.67	1.2
7	pH	6.26	6.75	8.09	7.11	6.64


Number of worms per 10cm3 of water
25.00
16.00
12.00
8.00
6.00
5.00
4.00
2.00
1.00
.6
0.01
0.11
0.12
0.5
0.78
0.82
0.93
1.02
1.23
1.4
2.34
Nitrate as N mg/l


Number of worms per 10cm3 of water
25.00
16.00
12.00
8.00
6.00
5.00
4.00
2.00
1.00
3.00
4.00
5.00
6.00
7.00
8.00
Phosphate as PO4 mg/l


Number of worms per 10cm3 of water
25.00
16.00
12.00
8.00
6.00
5.00
4.00
2.00
1.00
.00
1.00
2.00
3.00
4.00
5.00
Potassium as K mg/l

Conclusion

- ✓ Naidids (aquatic oligochaetes) decompose organic matter in all kinds of unpolluted wetlands.
- ✓ They are found in rice fields where agro-chemicals are not used
- ✓ The abundance/population density was found to be higher in pre-monsoon season when compared to monsoon and post-monsoon season.
- ✓ Asexual reproduction such as budding is noticed in favorable conditions
- ✓ Other aspects like toxicity analysis, study of life cycle, regeneration were also carried out in in-vitro conditions, besides water quality analysis and studying other ecological parameter in relation to species diversity in the in –vivo conditions

THANK YOU