

# Invasion of the genus *Marenzelleria* (Polychaeta: Spionidae) into the Don River mouth and the Taganrog Bay: morphological and genetic study

V.Syomin<sup>1</sup>, A.Sikorsky<sup>2</sup>, R.Bastrop<sup>3</sup>, B.Stradomski<sup>1</sup>,  
E.Fomina<sup>1</sup> & D.Matishov<sup>1</sup>

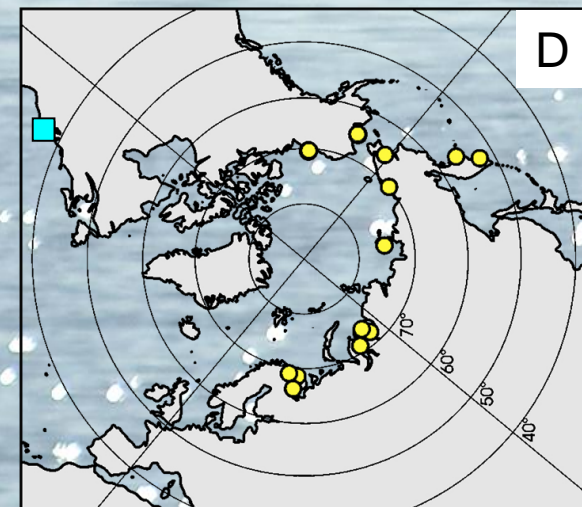
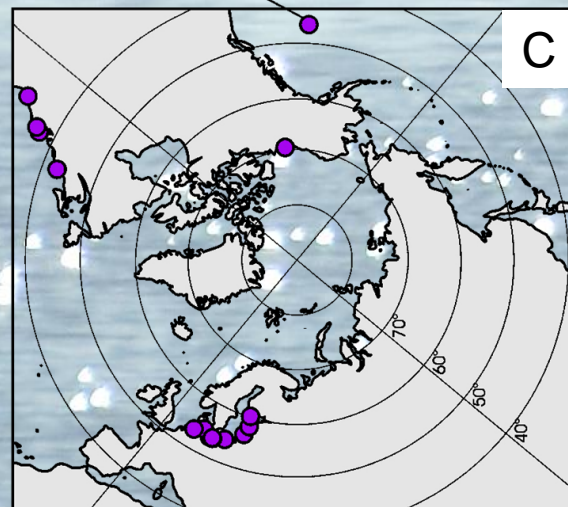
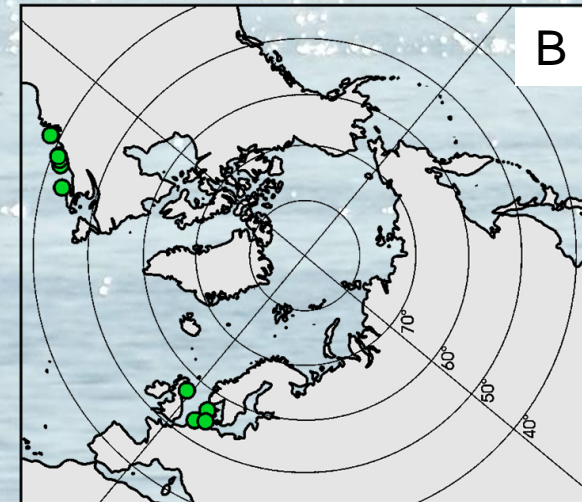
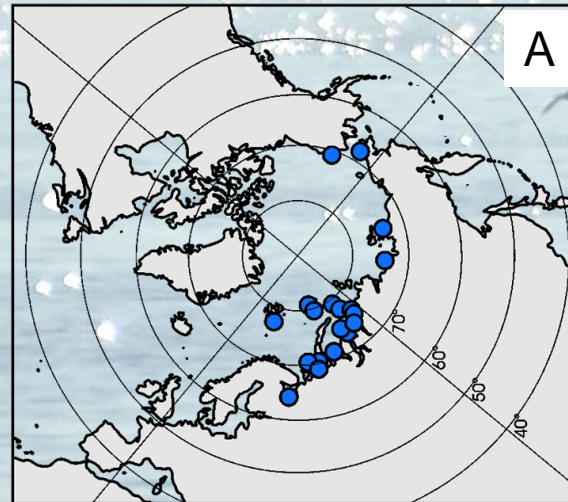
<sup>1</sup>Institute of Arid Zones, Southern Scientific Centre of Russian Academy of Sciences, Rostov-on-Don, Russia

<sup>2</sup>Akvaplan-niva AS, Tromsø, Norway

<sup>3</sup>University of Rostock, Institute of Biological Sciences, Animal Physiology, Rostock, Germany

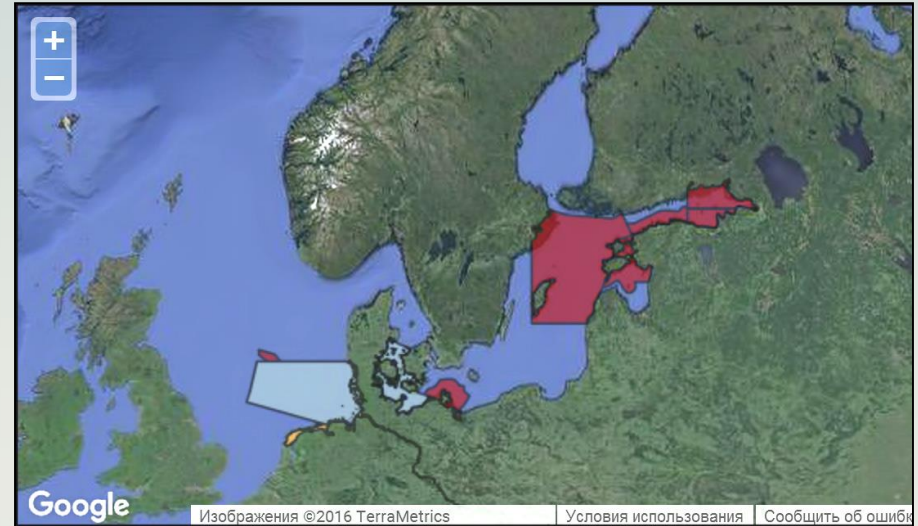
# Distribution of valid *Marenzelleria* species in the Northern Hemisphere

- A – *M. wireni*
- B – *M. viridis*
- C – *M. neglecta*
- D – *M. arctia*,  
*M. bastropi*



after: Sikorski A.V., Bick A.  
Revision of *Marenzelleria*  
Mesnil, 1896 (Spionidae,  
Polychaeta). Sarsia (2004)  
89: 253-275.

# Distribution of invasive *Marenzelleria* species in European waters



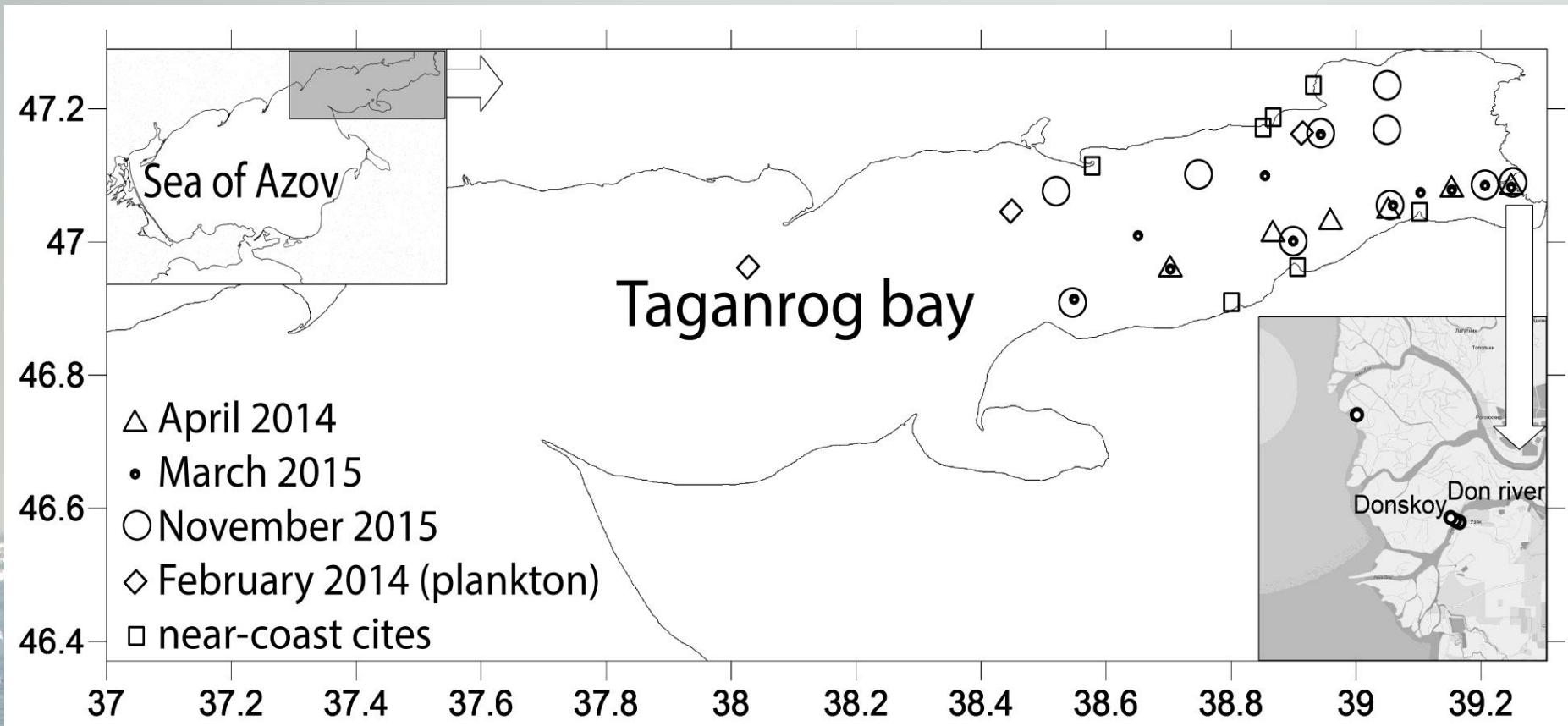
*M. neglecta* and *M. viridis* unseparated  
after: DAISIE - Delivering Alien Invasive  
Species Inventories for Europe

url: <http://www.europe-aliens.org/speciesFactsheet.do?speciesId=53375#>

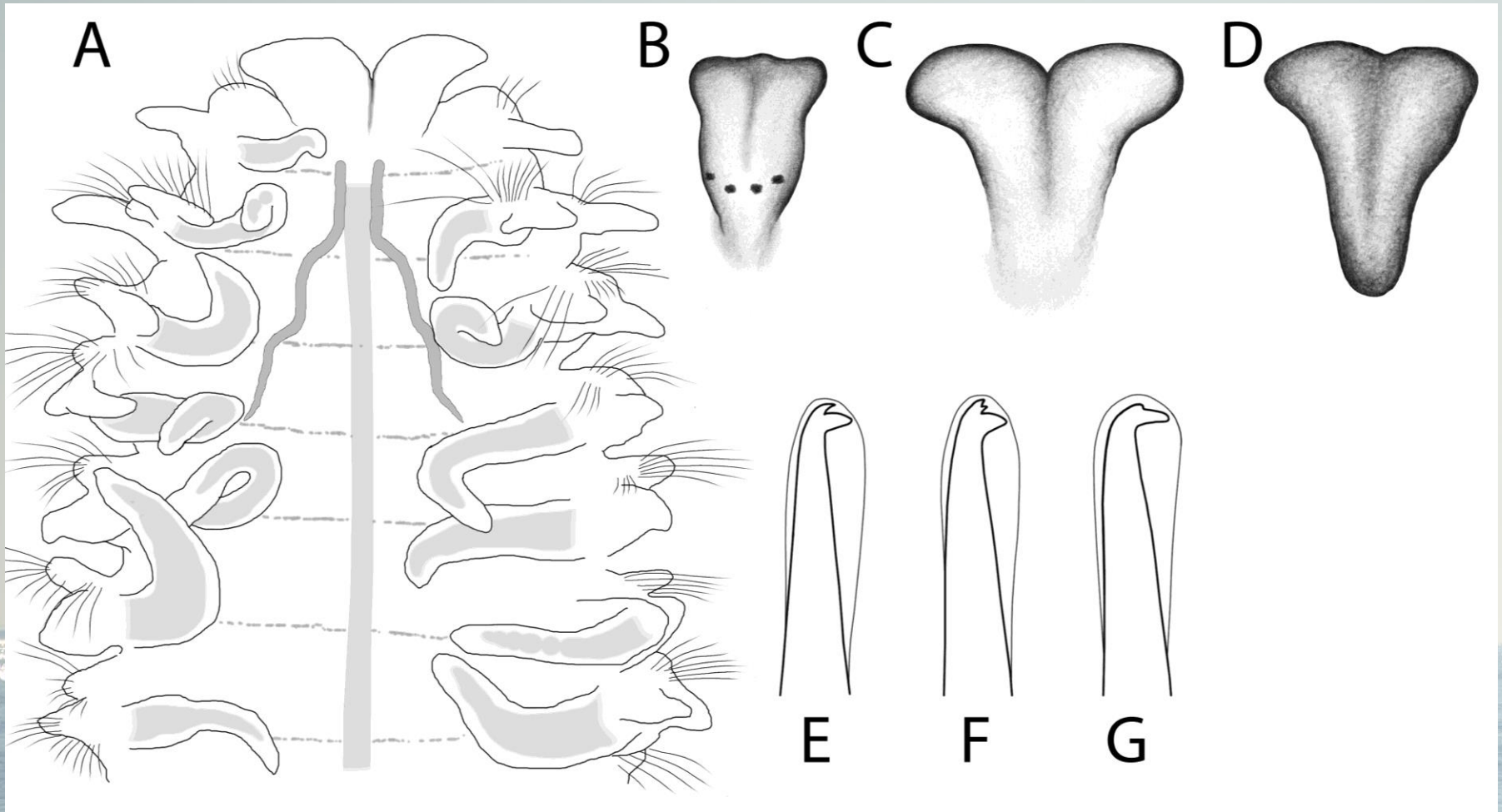
*M. neglecta*  
after: WORMS, World Polychaete  
Database

url: <http://www.marinespecies.org/polychaeta/aphia.php?p=taxdetails&id=181523>

# Sampling stations scheme

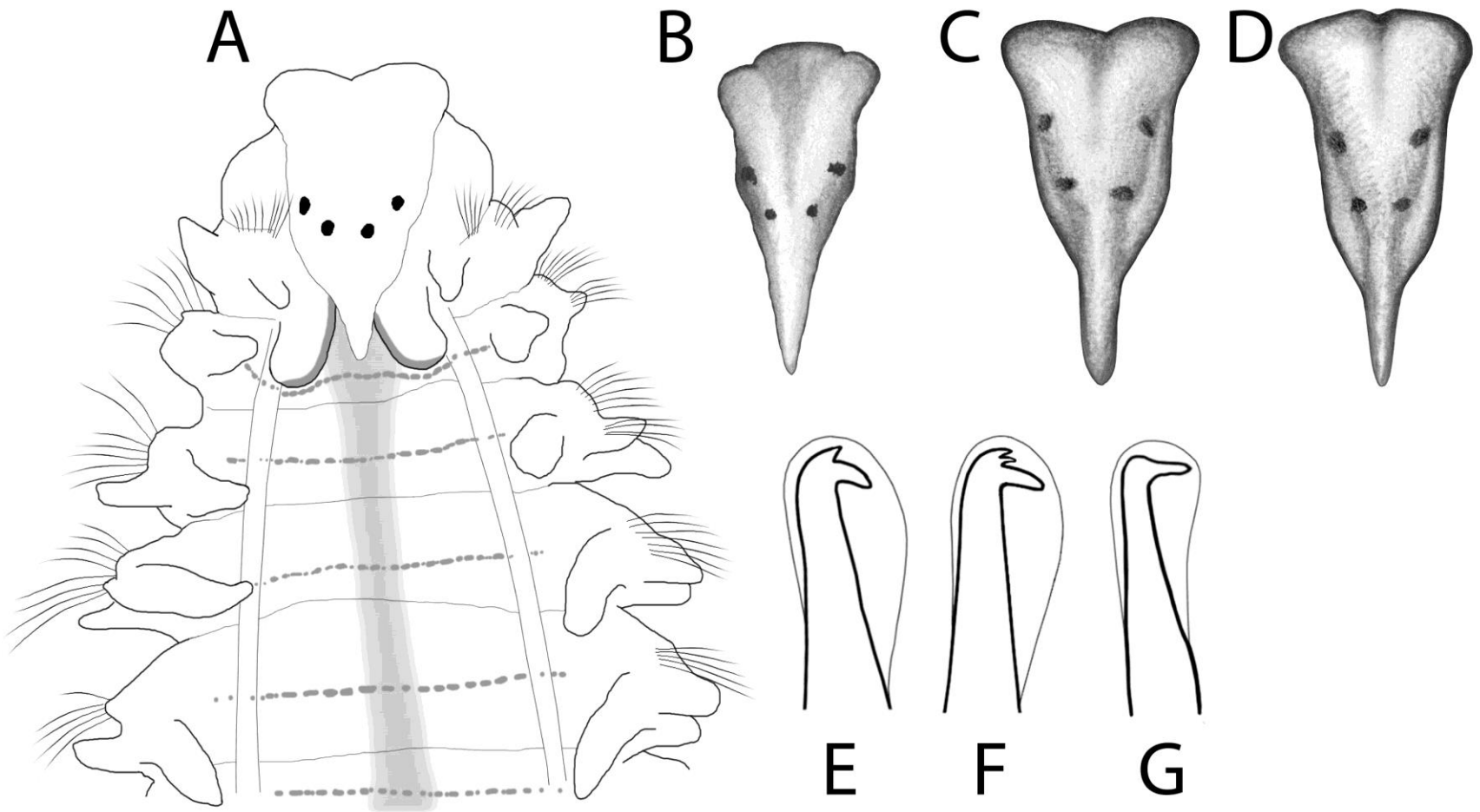


# *Marenzelleria neglecta*, “typical” form



A – anterior part of the body; B – juvenile prostomium; C – adult prostomium, dorsal view; D – adult prostomium, anterior-dorsal view; E-G – hooded hooks

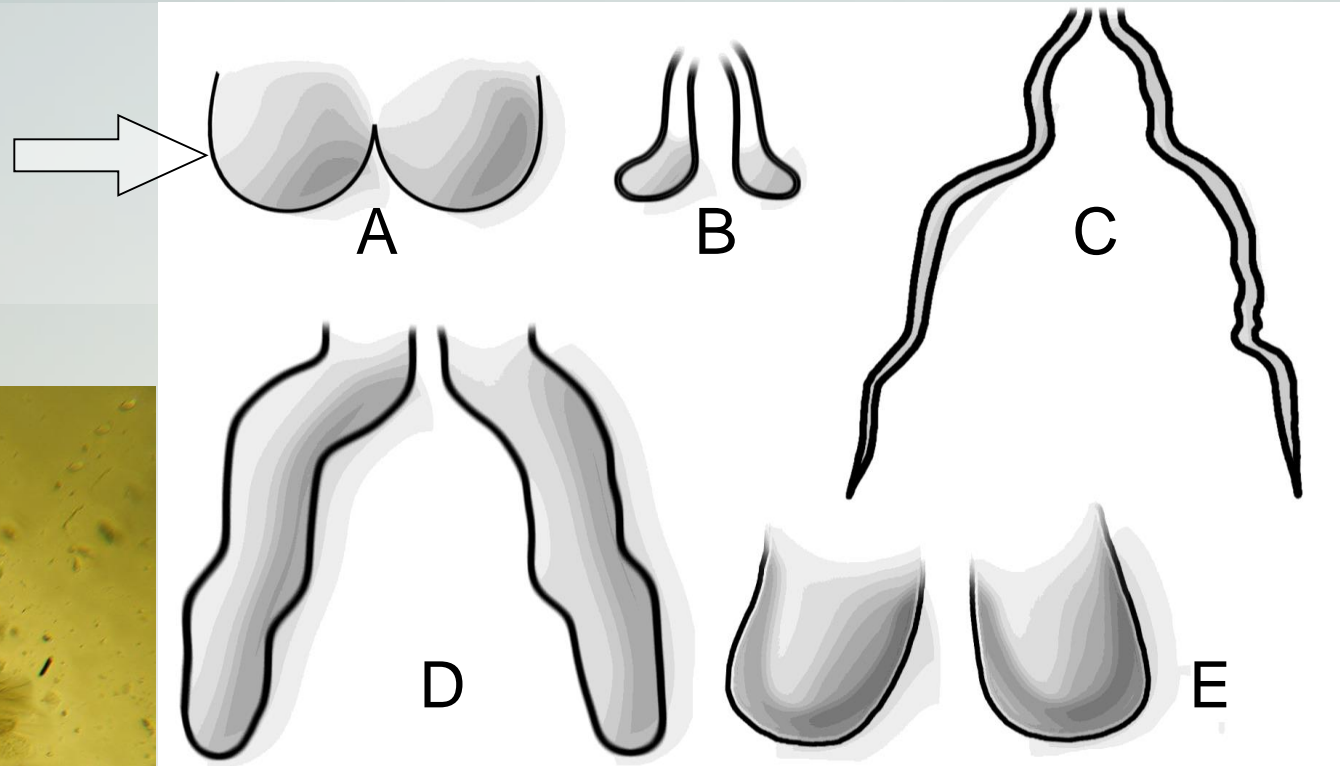
# *Marenzelleria neglecta*, “arctia-like” form



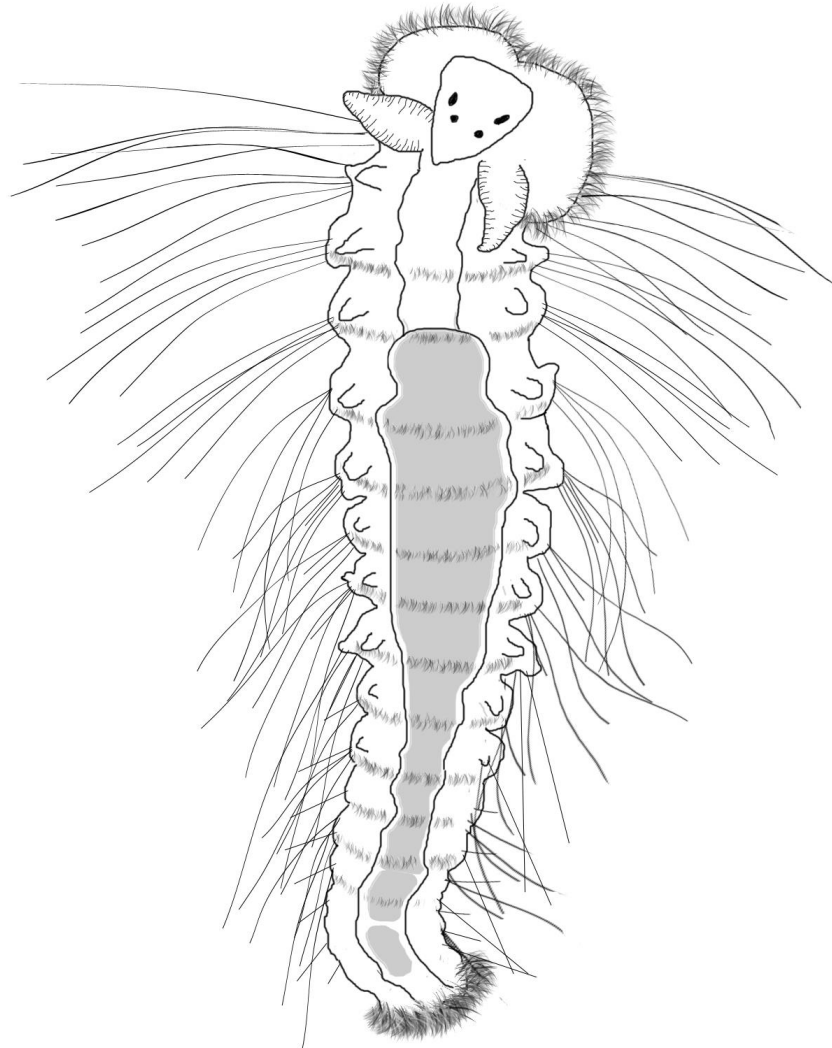
A – anterior part of the body; B – juvenile prostomium; C-D – adult prostomium; E-G – hooded hooks

# *Marenzelleria neglecta*: variability between specimens

Observed types of  
nuchal organs:  
A-B – juveniles,  
C-E - adults



Spionid larva (supposedly *Marenzelleria neglecta*)  
from the Taganrog Bay





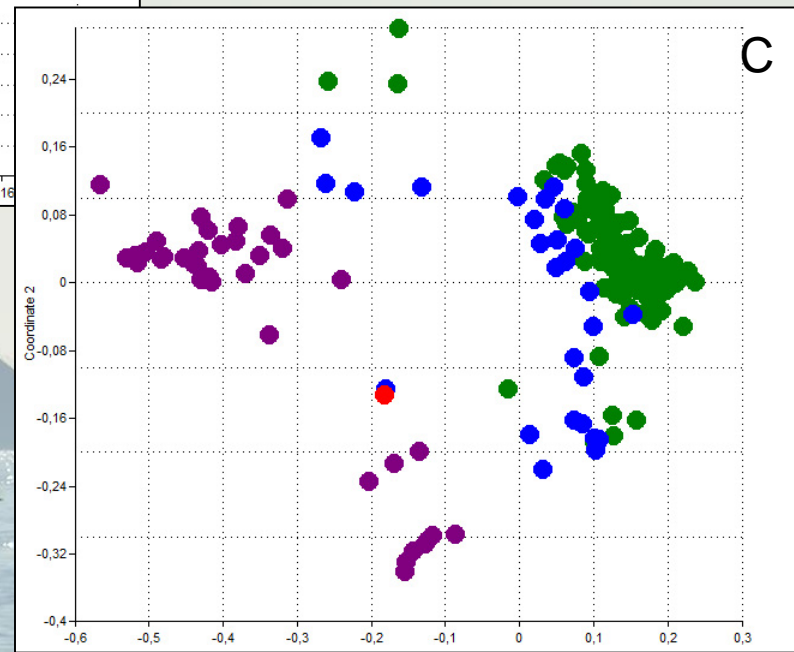
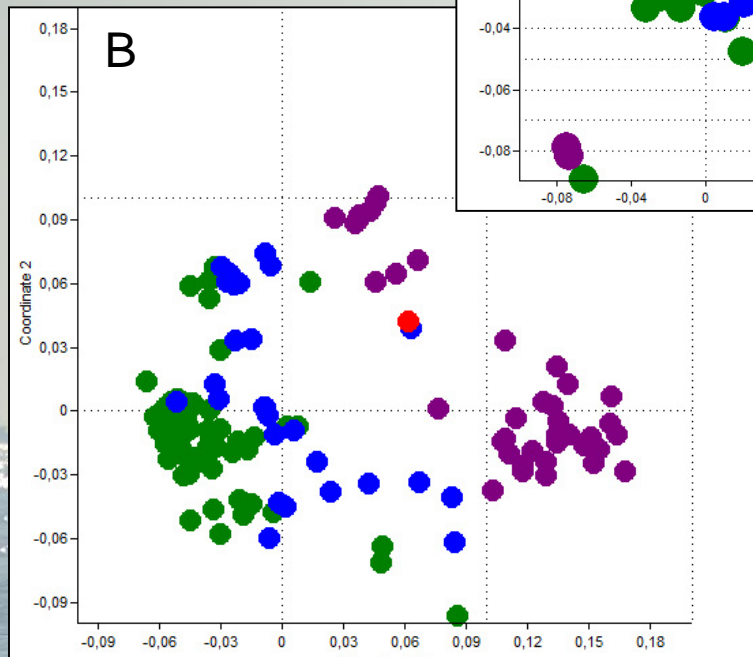
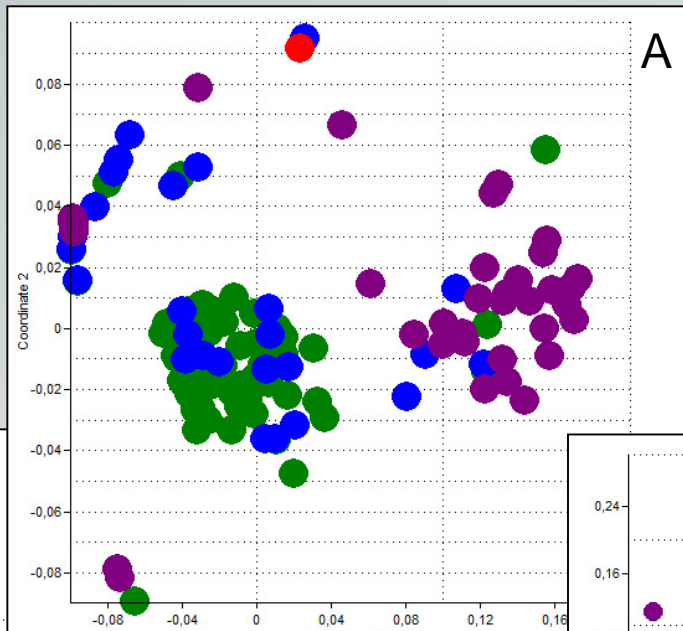
# Ordination of all examined specimens based on their morphometry

● “arctia-like” form:  
semicircle NO not  
crossing 2<sup>nd</sup> setiger  
midline

● “typical” form: NO  
long, bent, narrow,  
reaching 4<sup>th</sup> setiger  
end

● “transitional” form:  
NO long, straight, wide,  
reaching the beginning of  
4<sup>th</sup> setiger

● “transitional” form: NO  
long, bent, wide,  
reaching 4<sup>th</sup> setiger  
beginning

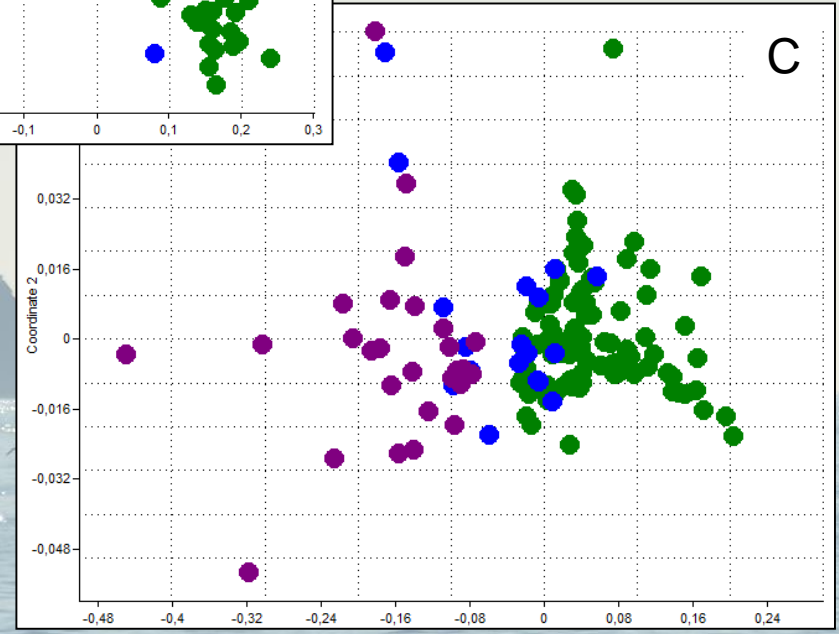
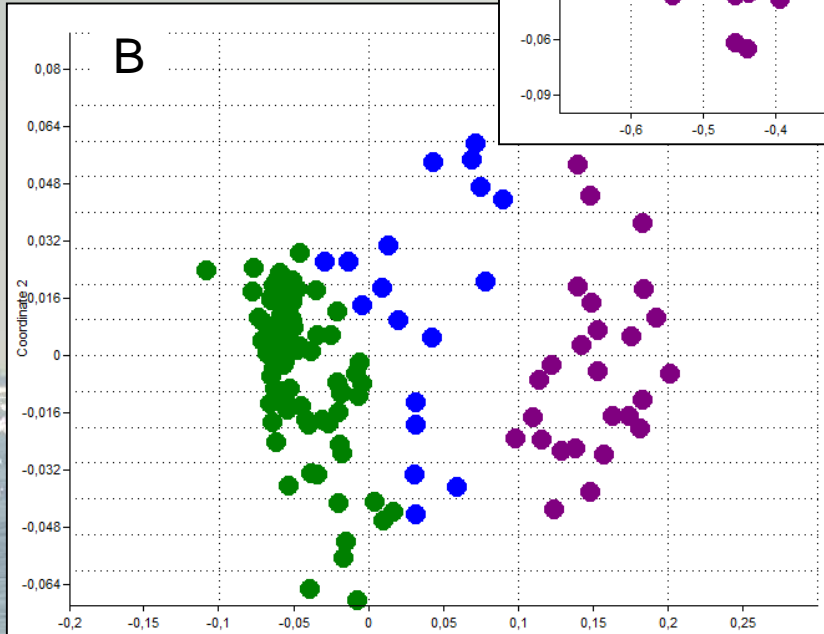
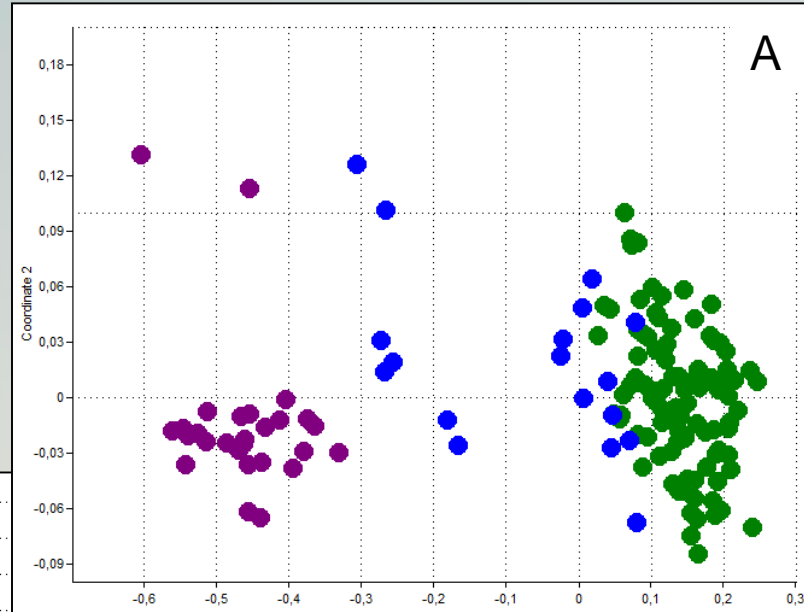


A – Multi-Dimensional Scaling, Euclidean distances; B – Multi-Dimensional Scaling, Gower similarity; C – Principal Coordinates, Gower similarity

# Ordination of only complete specimens representing all considered characters

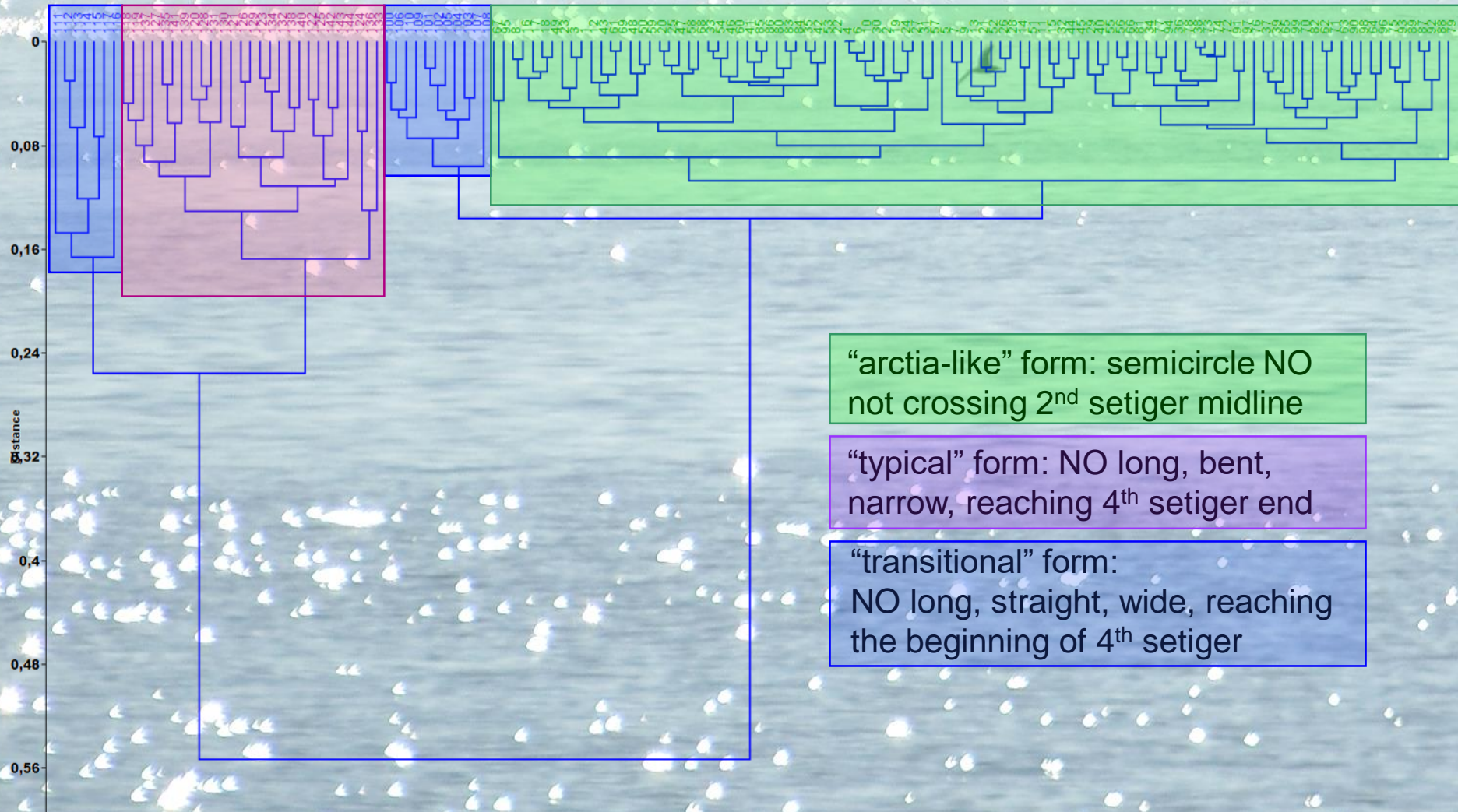
- “arctia-like” form: semicircle NO not crossing 2<sup>nd</sup> setiger midline
- “typical” form: NO long, bent, narrow, reaching 4<sup>th</sup> setiger end

- “transitional” form: NO long, straight, wide, reaching the beginning of 4<sup>th</sup> setiger



A – Principal Coordinates, Gower similarity; B – Multi-Dimensional Scaling, Gower similarity; C – Principal Coordinates, Correlation

Cluster analyses (Gower similarity) of complete specimens representing all considered characters: “transitional” specimens form neighboring clusters partly with “typical”, partly with “arctia-like” specimens

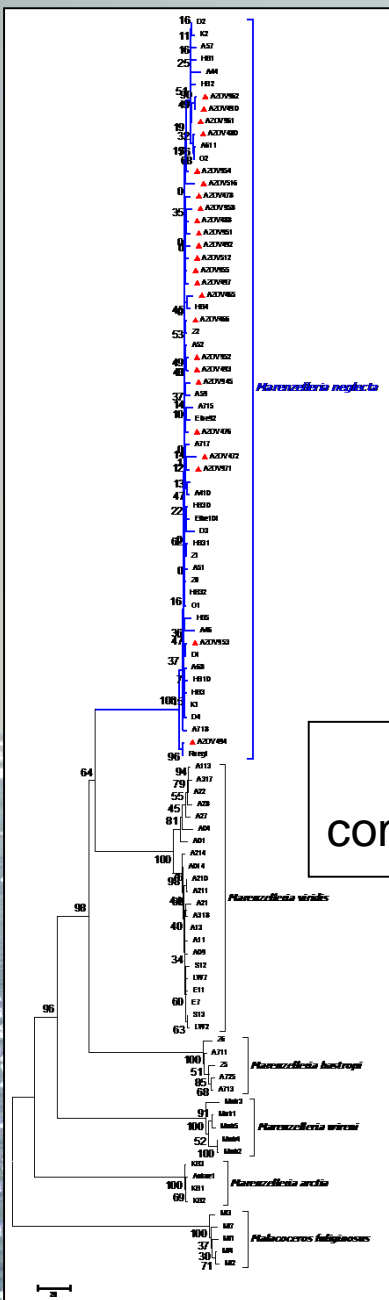


Blank, M., & Bastrop, R. (2009). Phylogeny of the mud worm genus *Marenzelleria* (Polychaeta, Spionidae) inferred from mitochondrial DNA sequences. *Zoologica Scripta*, 38(3), 313-321.

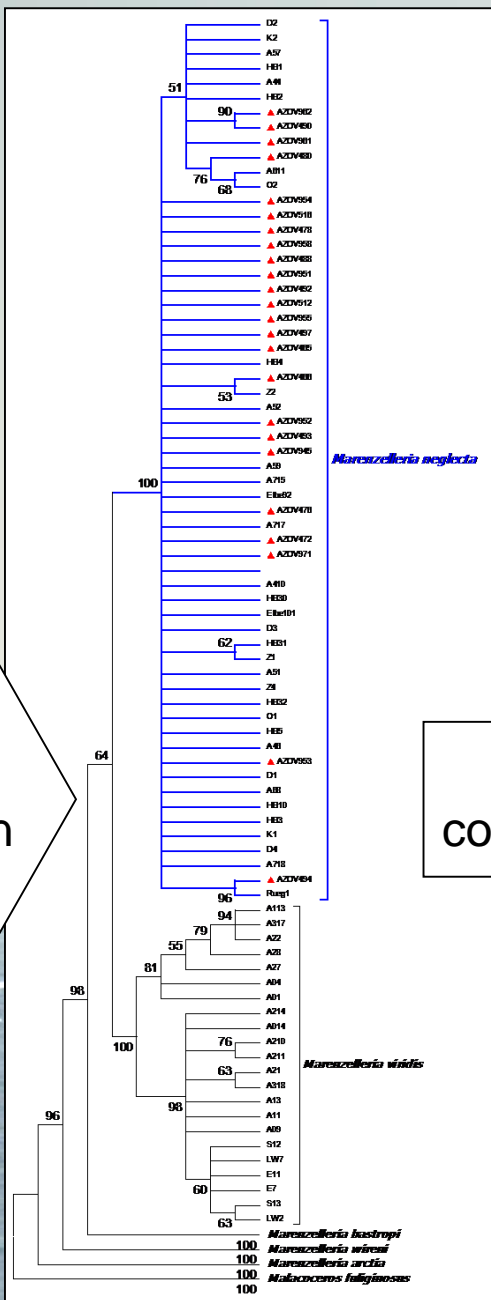
Radashevsky, Vasily I., et al. "Molecular identity, morphology and taxonomy of the *Rhynchospio glutaea* complex with a key to *Rhynchospio* species (Annelida, Spionidae)." *Systematics and Biodiversity* 12.4 (2014): 424-433.



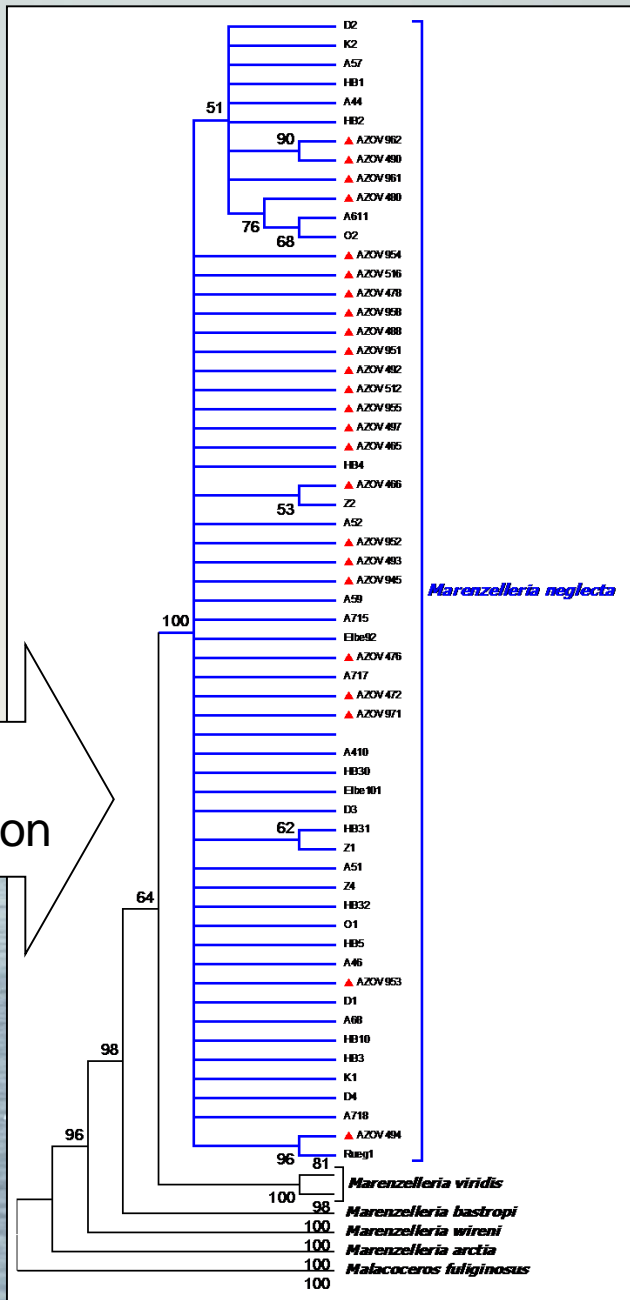
# Evolutionary relationships of taxa: compression of Tree 1(COI+16S+Cytb)



partial  
compression



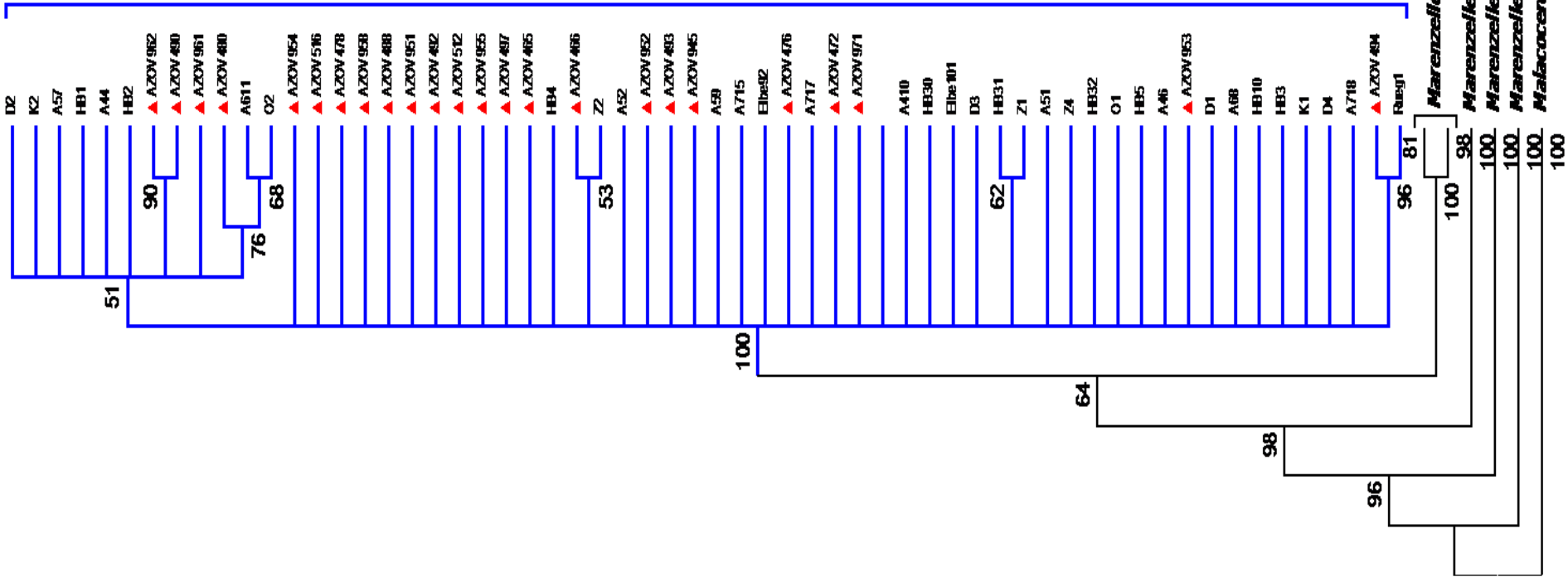
final  
compression



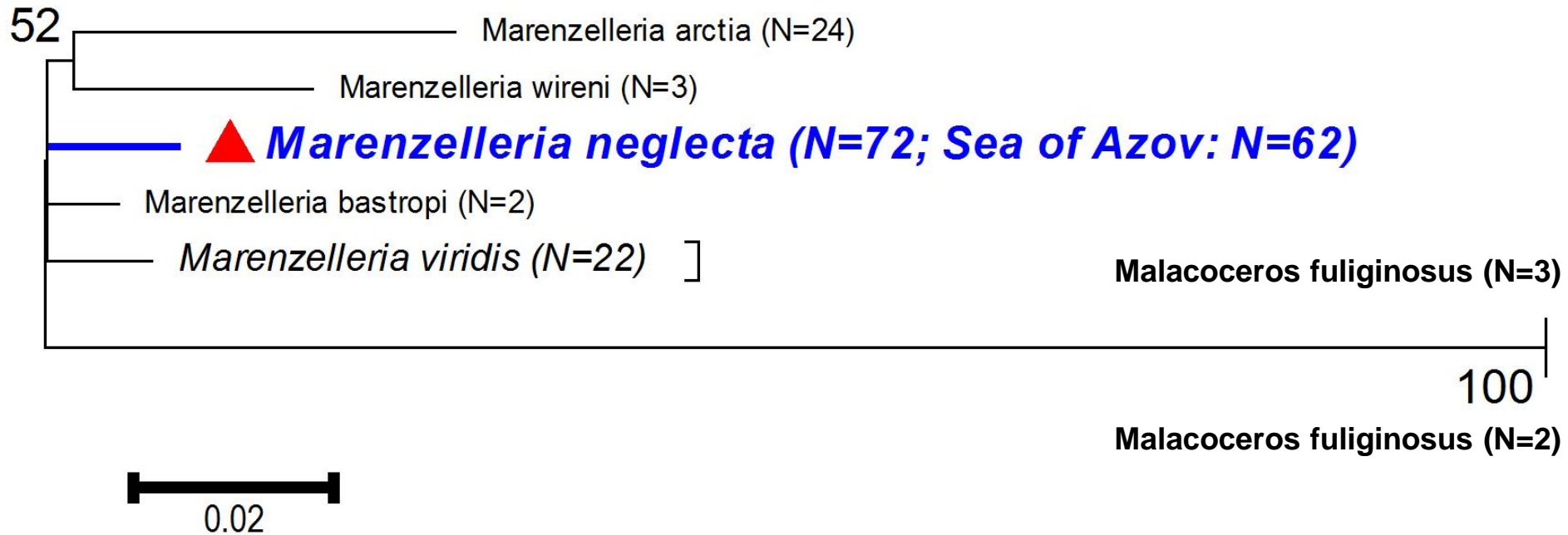
# Evolutionary relationships of taxa

## Tree 1(COI+16S+Cytb), compressed

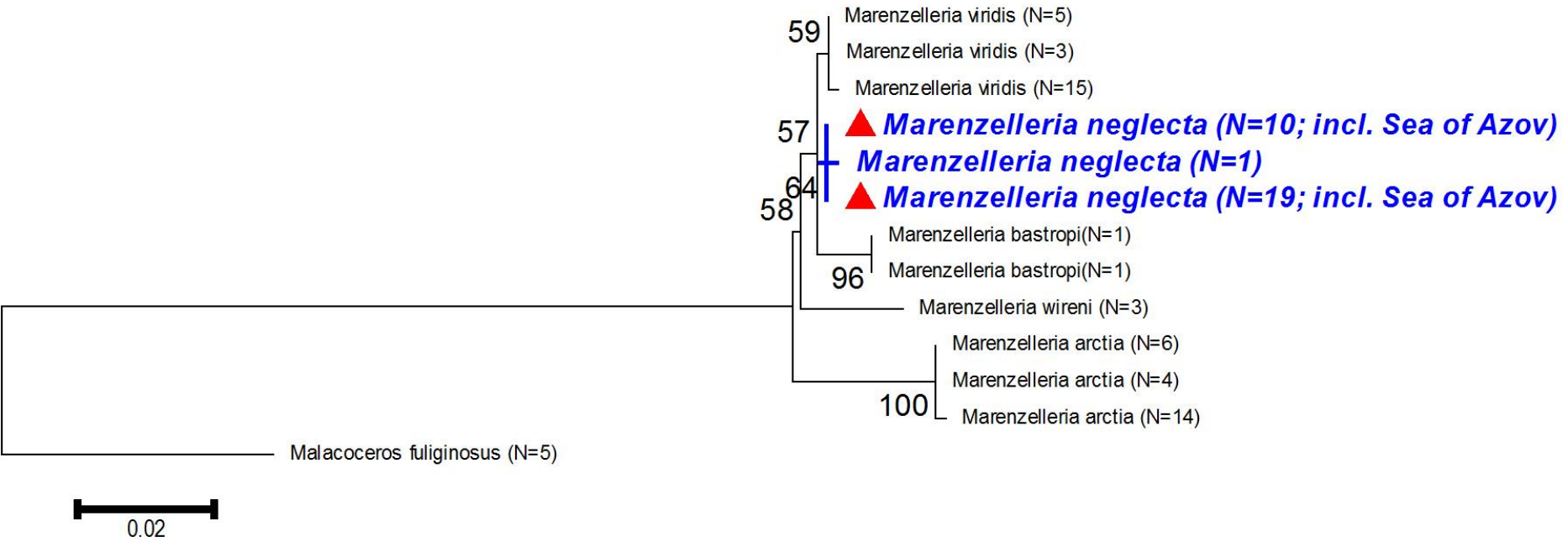
*Marenzelleria neglecta*



# Histone 3a Molecular Phylogenetic analysis by Maximum Likelihood method



# 28S rDNA Molecular Phylogenetic analysis by Maximum Likelihood method



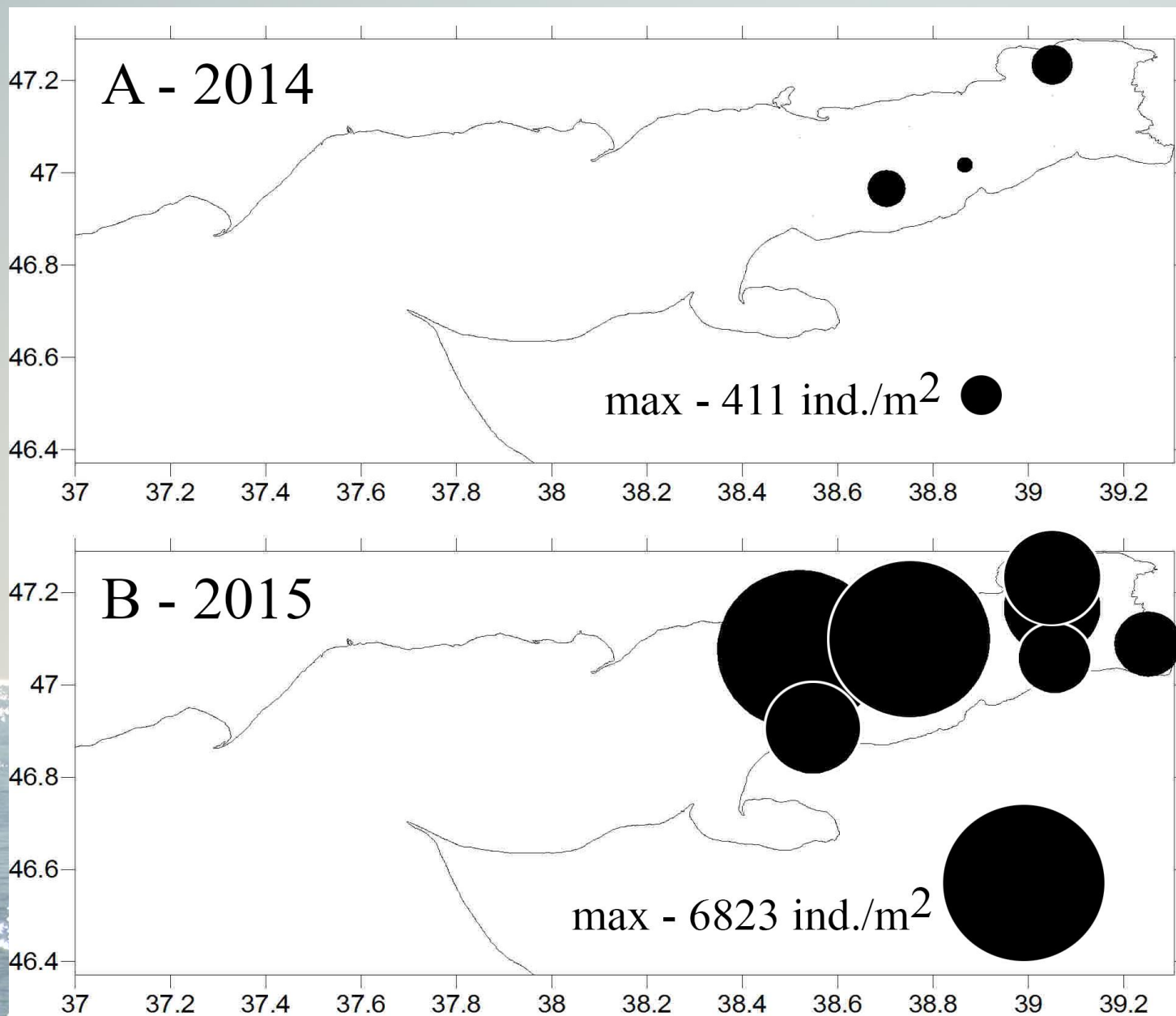


# Numeric characters of *M. neglecta* from the lower Don River and the Taganrog Bay compared to the published data (Sikorski, Bick, 2004).

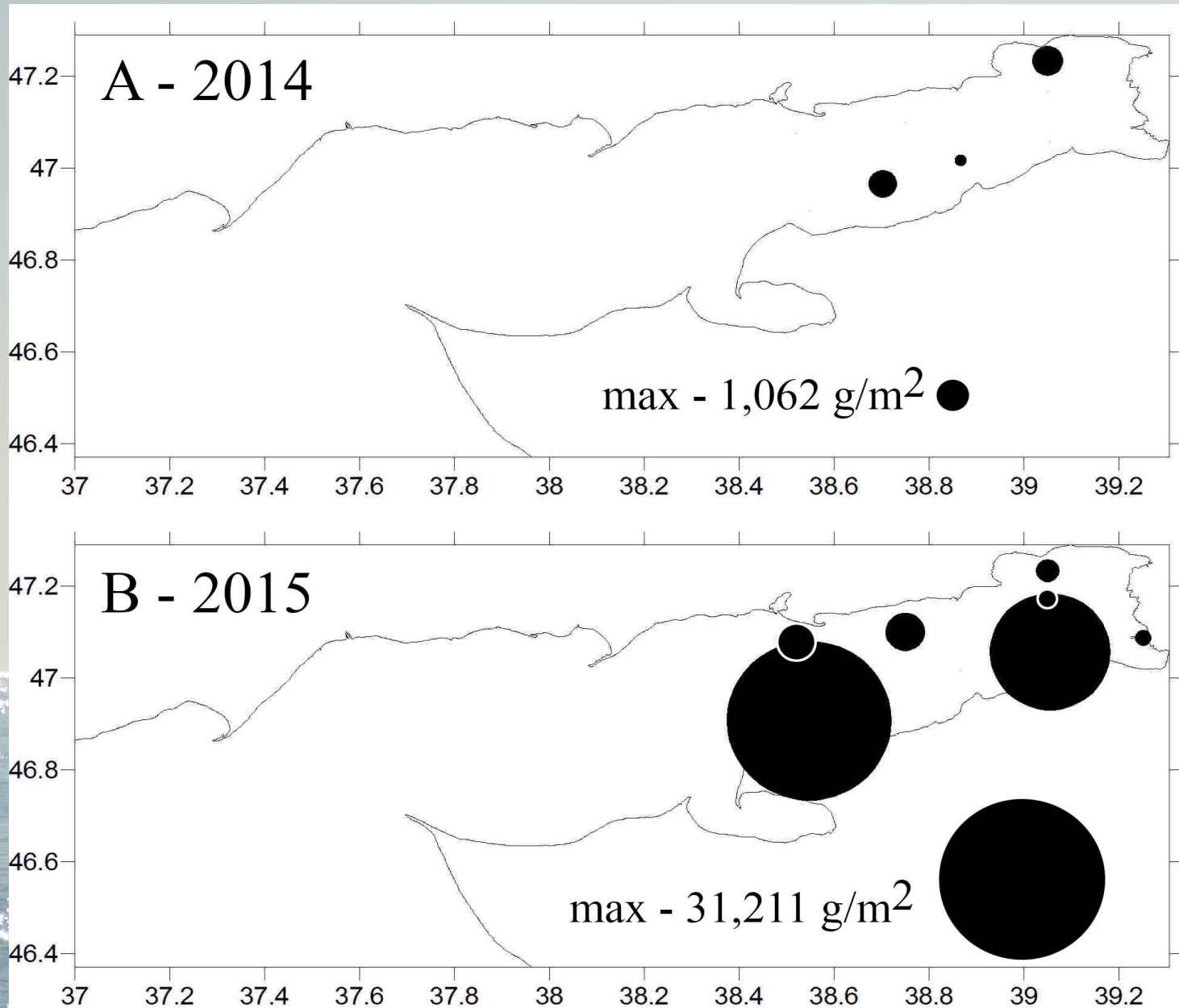
width	≤0.4 mm		0.5 - 0.7 mm		0.8 - 1.0 mm		1.1 - 1.3 mm		1.4 - 1.6 mm		1.7 - 1.9 mm		≥2.0 mm	
	total quantity/full specimens	61/51 specimens	publi shed data	58/47 specimens	publis hed data	6/2 specimens	publis hed data	6/0 specimens	publis hed data	2/0 specimens	publis hed data	12/1 specimens	publis hed data	29/0 specimens
<b>Set</b>	19...50	15...5 7	28...66	52...12 2	58...73	79...18 1	>82	160...2 10	>62	194...2 03	99...>1 31	-	>109	205...2 09
<b>VHH</b>	10...21	14...2 2	14...26	21...36	21...38	25...41	33...40	36...48	27...34	45...50	35...45	51	33...44	48
<b>DHH</b>	11...25	16...2 6	16...30	25...42	27...41	28...46	41...48	41...57	32...41	55...63	39...51	58...6 7	40...53	58
<b>Br</b>	2...12	1...21	7...20	16...37	17...34	24...43	40...43	43...64	30...36	53...69	36...56	60	37...53	60...63
<b>NO</b>	1b...2e	1e...3 m	1b...2e	1e...3 m	2m...4 m	2b...4 m	2m...4 m	2e...4e	3m...4 b	3m...4 m	3b...4 m	3e...4 m	2b...4e	3e...4b
prevailing form	S/C	-	S/C	-	LSW	-	S/C	-	LBN	-	LBN	-	LBN	-
frequency of prevailing form	93%	-	71%	-	50%	-	50%	-	100%	-	92%	-	83%	-
other present forms	LSW	-	LSW	-	S/C; LBN	-	LSW; LBN	-	-	-	LBW	-	S/C; LSW	-
<b>Br-VHH</b>	-15...- 5	-6...-2	-12...- 3	-11...4	-4	-5...7	2...7	0...18	2...3	4...24	1...14	9	1...19	12
<b>Br-DHH</b>	-16...- 6	-10...- 6	-16...- 7	-16...- 4	-10...- 7	-10...- 1	-6...-1	-8...7	-5...-2	-7...12	-3...10	-7...2	-6...13	2...6
<b>DHH-VHH</b>	0...4	2...4	1...7	2...8	3...6	3...10	8	3...11	5...7	6...15	4...11	16...1 7	5...12	10

Note: S/C – semicircle, LSW - long straight wide, LBW - long bent wide, LBN - long bent narrow.

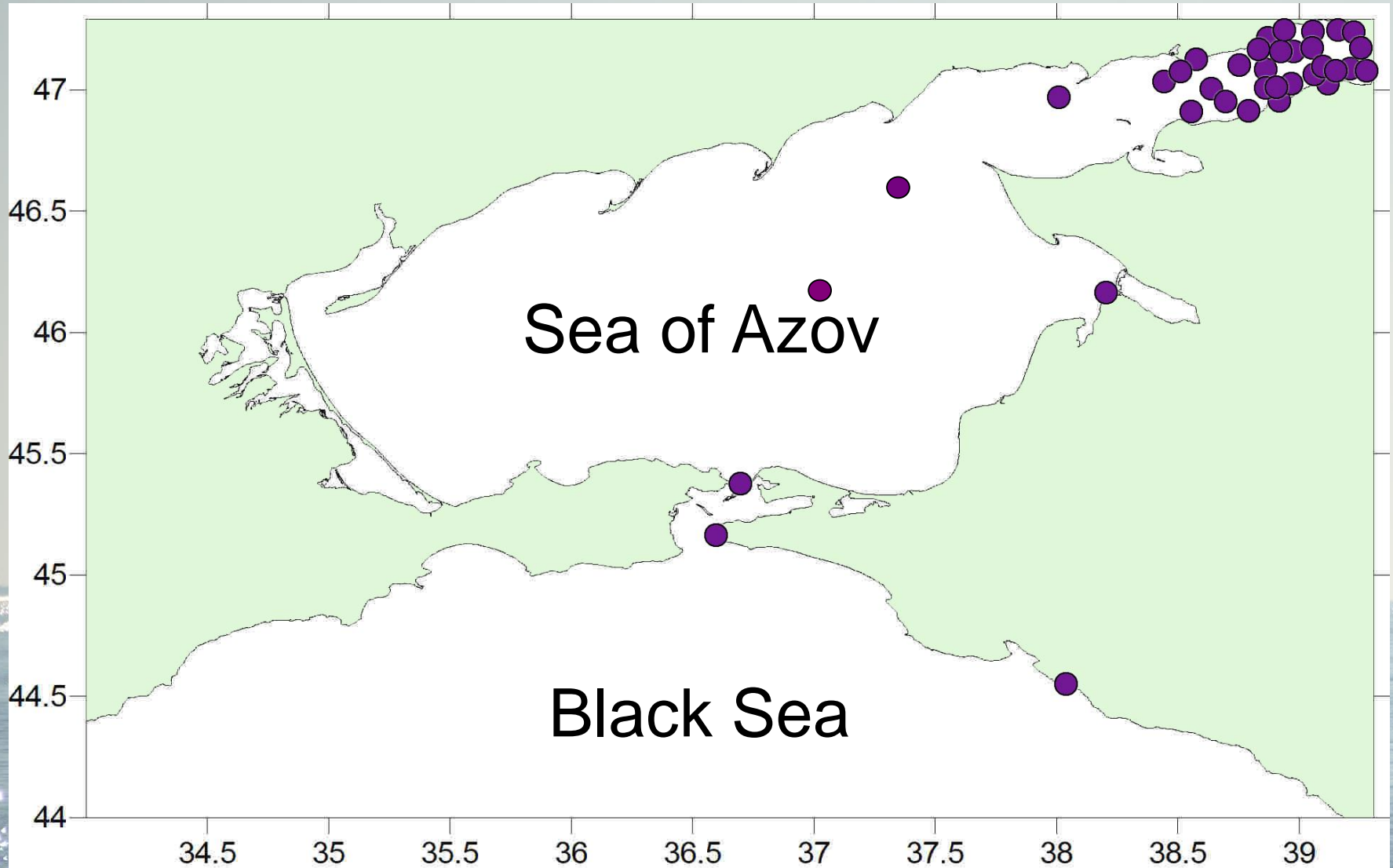
# Distribution of *Marenzelleria neglecta* quantity in the Taganrog Bay in April 2014 - March 2015



# Distribution of *Marenzelleria neglecta* biomass in the Taganrog Bay in April 2014 - March 2015



# Our recordings of *Marenzelleria neglecta* in the Sea of Azov and the Black Sea basins





**Thanks for your attention!**