

WRW

2023

Eco friendly meeting

International hybrid conference
6th Water Resources and Wetlands

13-17 September 2023 | Tulcea, Romania

ARLG

Romanian Limnogeographical Association



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UNIVERSITY OF TRIESTE



Department of Life Sciences



RISERVA NATURALE FOCE DELL'ISONZO

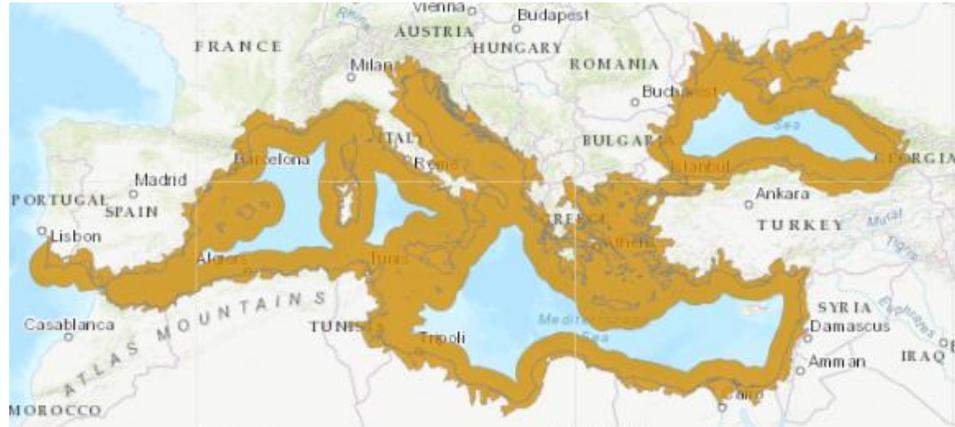


Ca' Foscari University of Venice

Department of Environmental Sciences, Informatics and Statistics

Target species

Marbled goby *Pomatoschistus marmoratus* Risso, 1810



Black-spotted goby *Pomatoschistus canestrinii* Ninni, 1883



Adriatic Dwarf goby *Knipowitschia panizzae* Verga, 1841

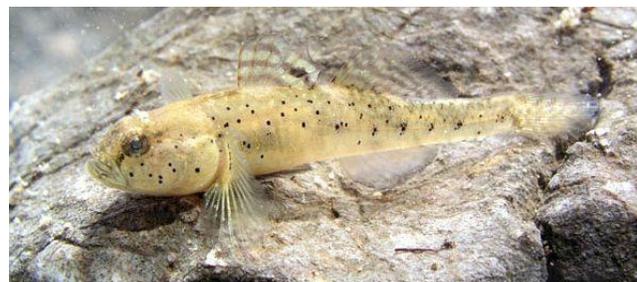


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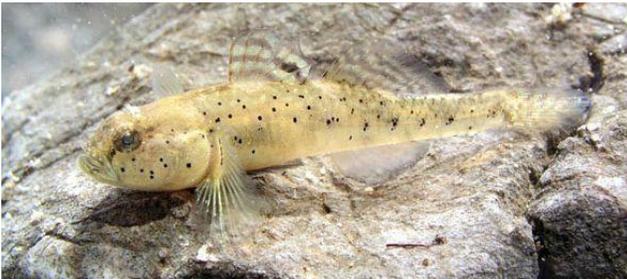
Annex II, Habitat Directive 92/43/EEC

Study area: the Natural Regional Reserve of the Isonzo River Mouth

P. marmoratus



P. canestrinii



K. panizzae



Aims of the study



Check the distribution of the target species in the area

Investigate ecological preferences in relation to abiotic features

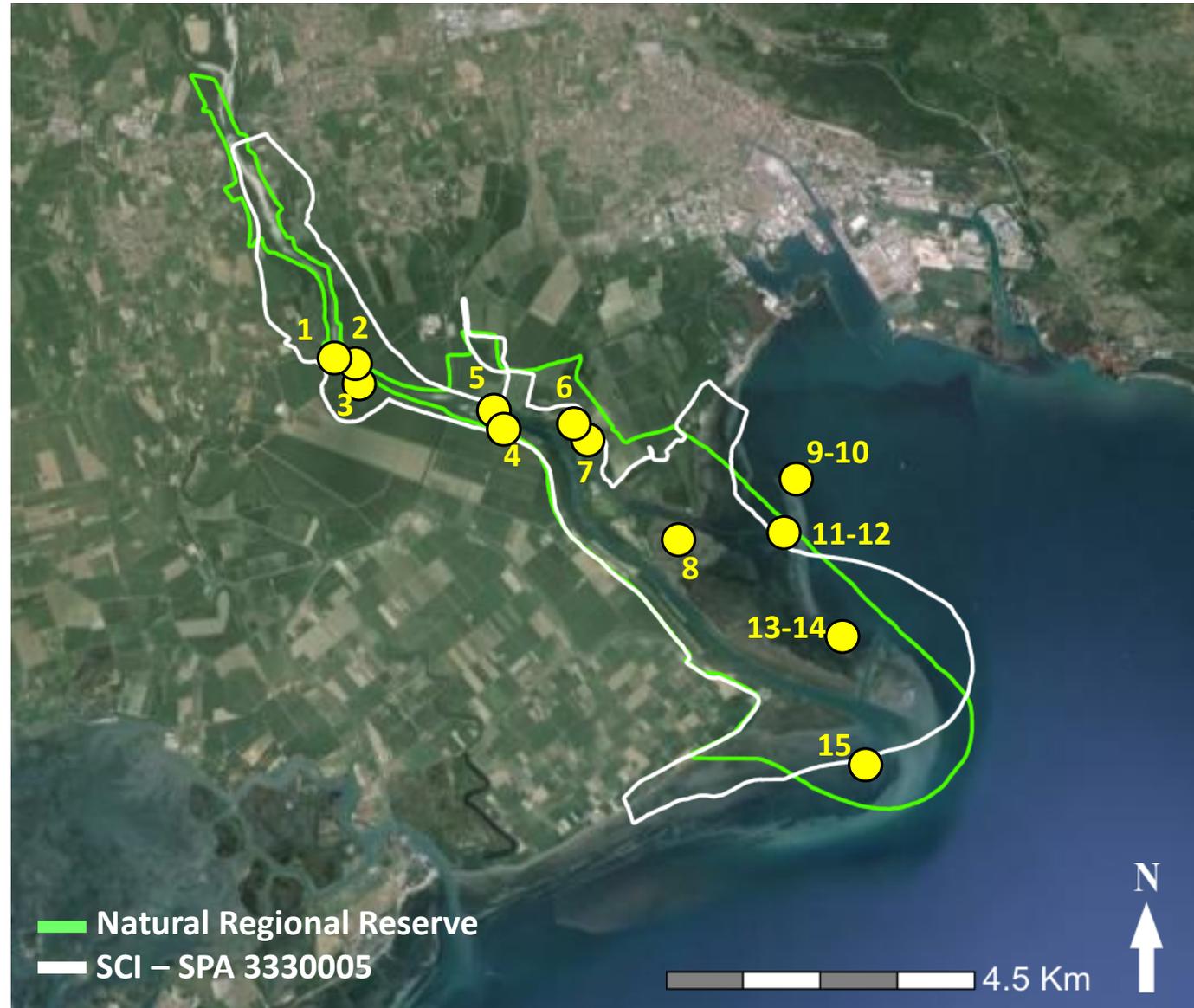


Management and conservation purposes

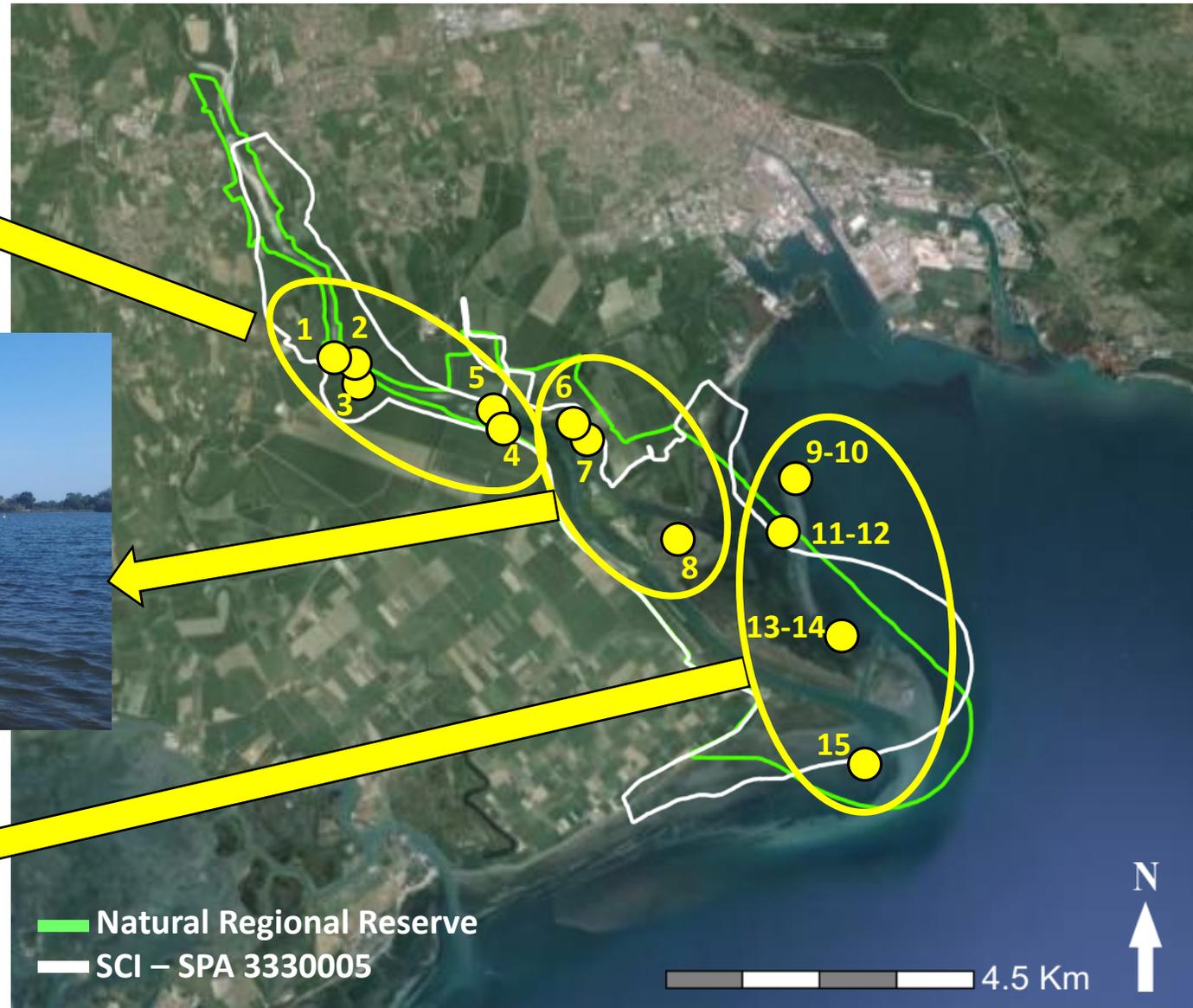
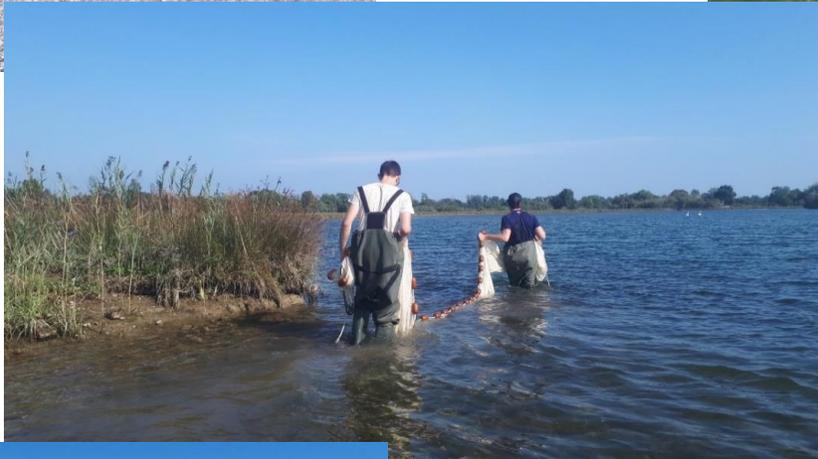
Study area: the Natural Regional Reserve of the Isonzo River Mouth



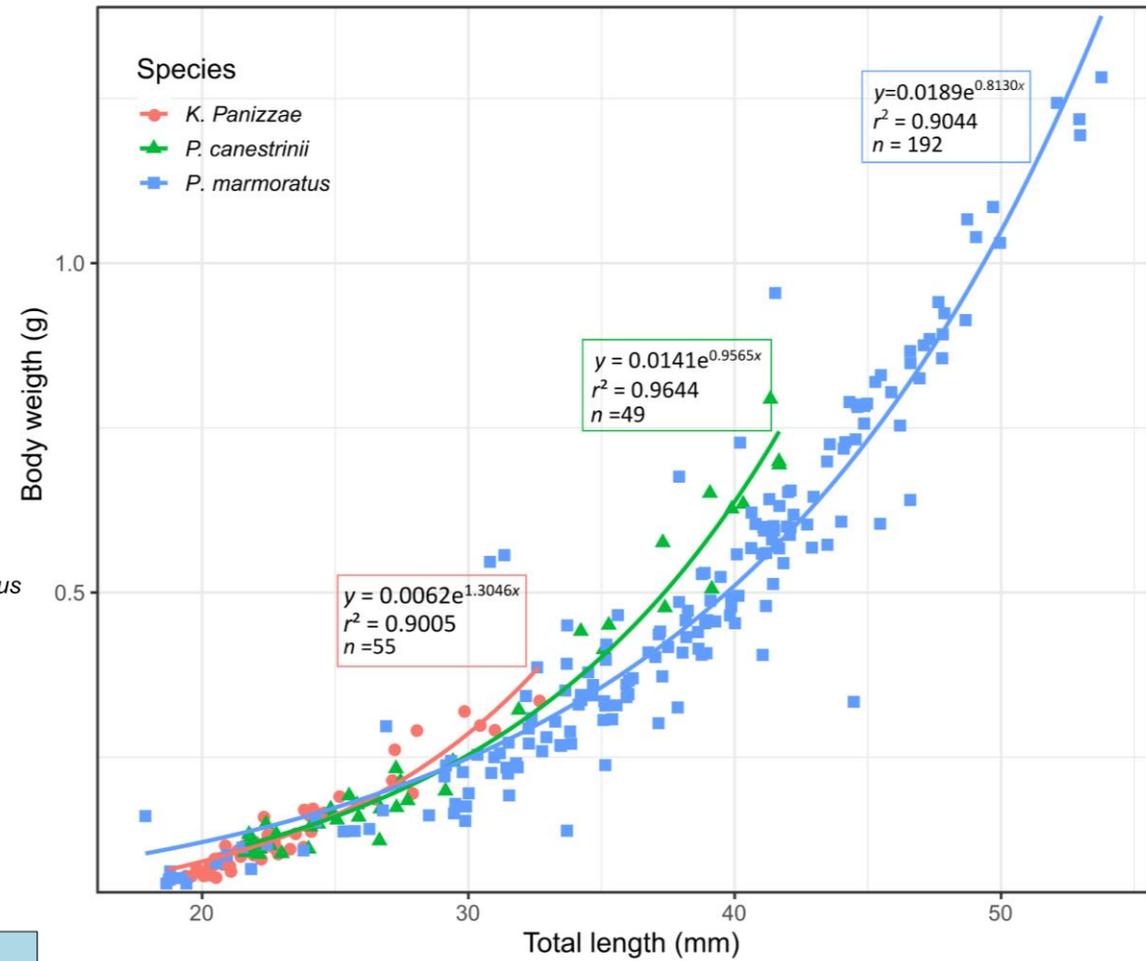
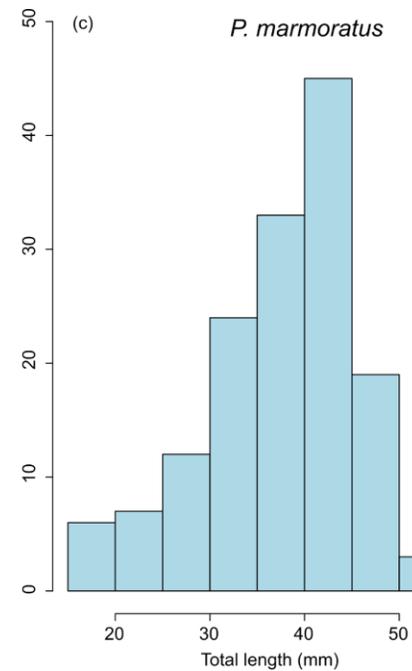
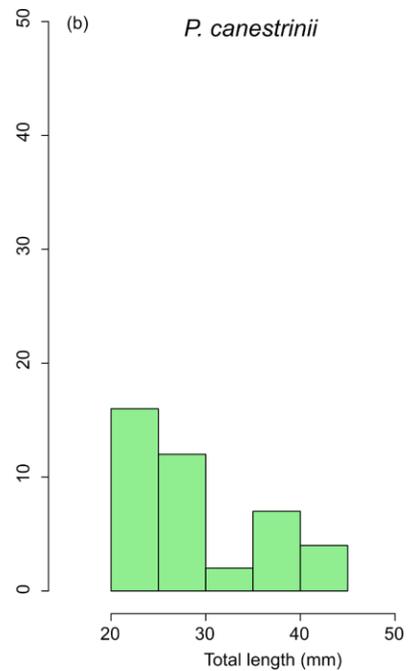
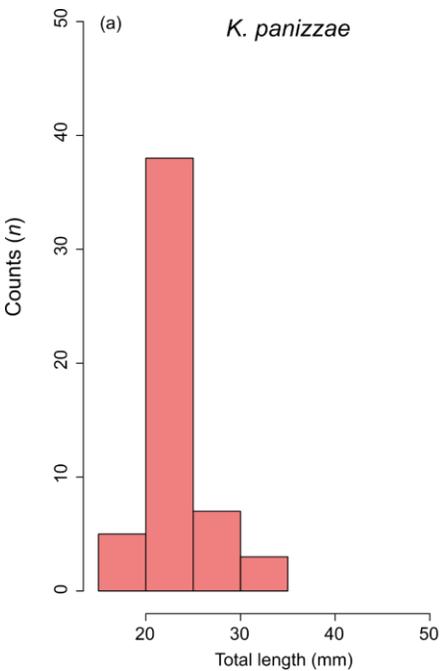
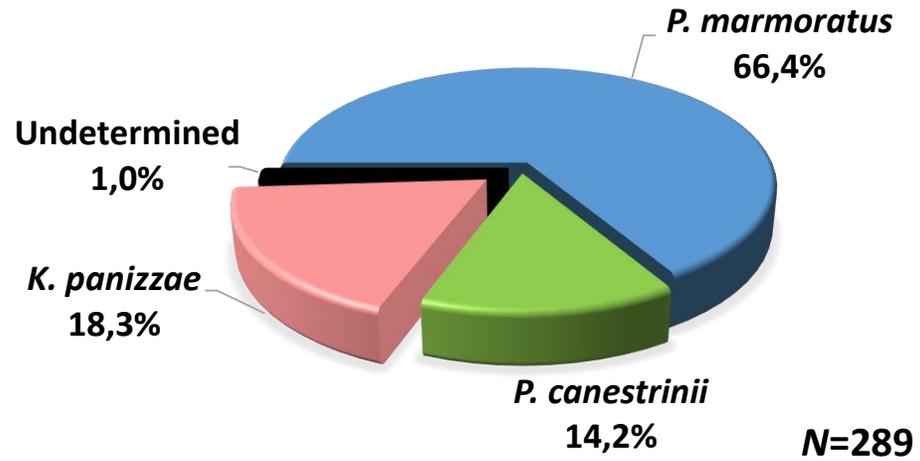
- Five sampling campaigns from June 2019 to January 2020
- Fish samplings with a dragnet (10 m x 1.2 m, 2 mm mesh size)
 - Total Length (mm)
 - Weight(g)
- Vegetation cover (%)
- Substrate composition
- Water Temperature (°C)
- Conductivity (mS cm⁻¹)
- pH



Study area: the Natural Regional Reserve of the Isonzo River Mouth



Results: population structures and growth

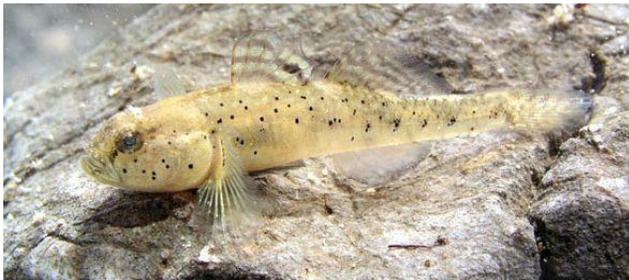


Study area: the Natural Regional Reserve of the Isonzo River Mouth

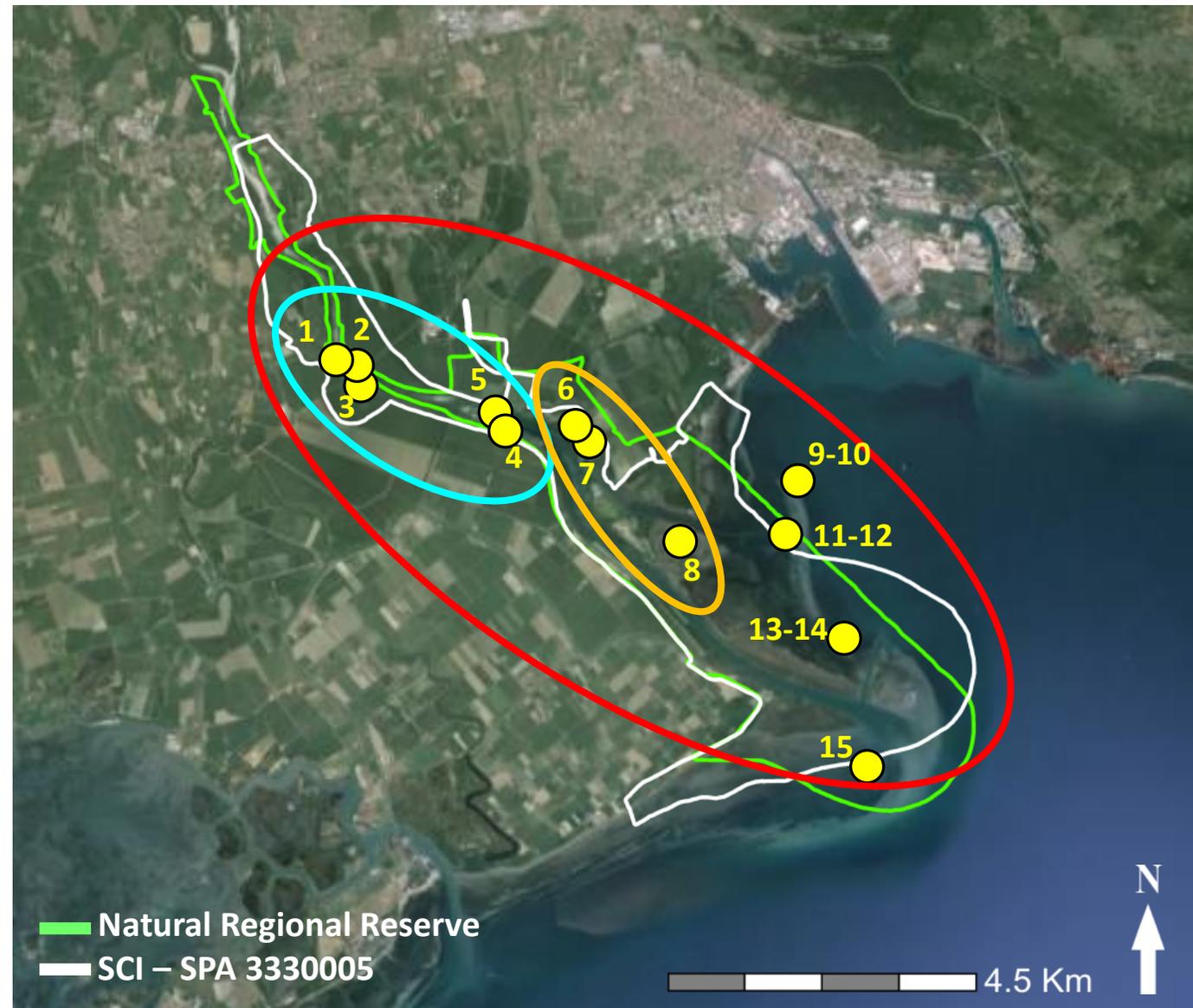
P. marmoratus



P. canestrinii



K. panizzae

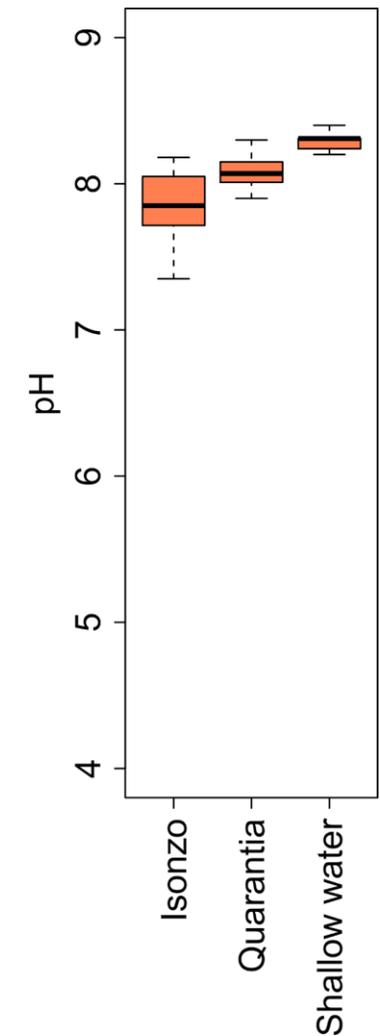
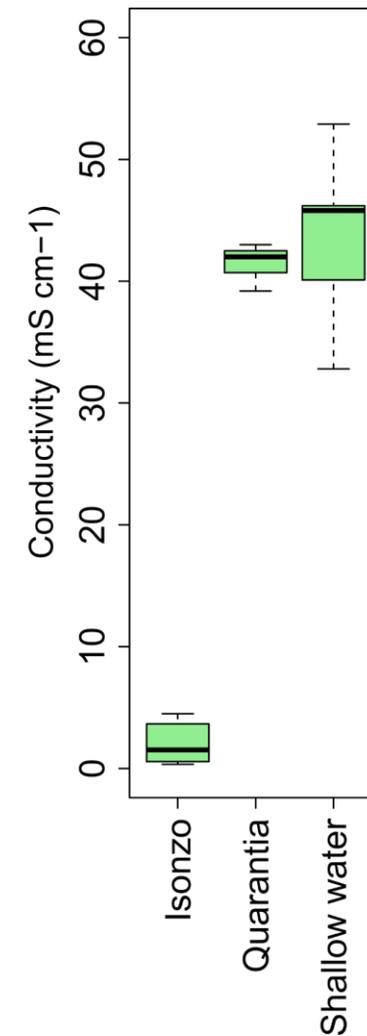
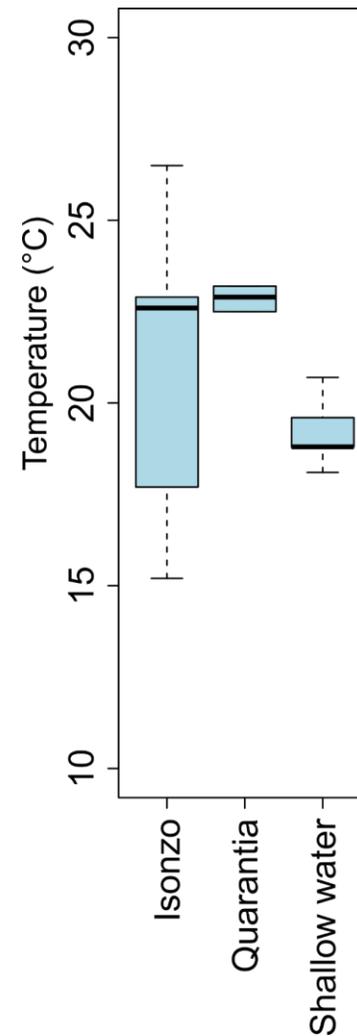


Results: abiotic features

Site	Code	Environment	Latitude	Longitude	Substrates	Vegetation cover
1	F_Cm	Isonzo River	45°46'26.5"N	13°27'12.7"E	MIC	1
2	F_Bm	Isonzo River	45°46'25.3"N	13°27'18.9"E	MIC	1
3	F_Am	Isonzo River	45°46'25.2"N	13°27'19.8"E	MIC	1
4	F_Av	Isonzo River	45°46'01.3"N	13°28'47.3"E	MIC	1
5	F_Bv	Isonzo River	45°46'02.1"N	13°28'47.5"E	MIC	1
6	Q2	Quarantia Canal	45°45'53.1"N	13°29'55.3"E	ARG	4
7	Q1	Quarantia Canal	45°45'50.7"N	13°29'47.4"E	ARG	4
8	Q3	Quarantia Canal	45°44'52.2"N	13°31'00.5"E	ARG	4
9	M3	Shallow sea waters	45°45'28.9"N	13°32'25.7"E	SAN	5
10	M3	Shallow sea waters	45°45'28.9"N	13°32'25.7"E	SAN	1
11	M2	Shallow sea waters	45°45'03.6"N	13°32'32.5"E	SAN	5
12	M2	Shallow sea waters	45°45'03.6"N	13°32'32.5"E	SAN	1
13	M1	Shallow sea waters	45°44'11.7"N	13°32'53.5"E	SAN	5
14	M1	Shallow sea waters	45°44'11.7"N	13°32'53.5"E	SAN	1
15	M4	Shallow sea waters	45°43'01.5"N	13°32'52.2"E	SAN	5

MIC = pebbles of 2-6 cm diameter, ARG = clay-silt, SAN = sand

Vegetation cover: 0-20%, 2: 20-40%, 3: 40-60%, 4: 60-80%, 5: 80-100%



● Freshwater sites
● Transitional sites

Conclusions

P. marmoratus



- High abundances as observed in Venice Lagoon, Greece and Iberian Peninsula (Koutrakis et al., 2005; Franco et al., 2006a,b; Verdiell-Cubedo et al., 2008; Franzoi et al., 2010) and in the same area by Chiti et al. (2017)
- Low habitat preferences (Malavasi et al., 2005; Verdiell-Cubedo et al., 2008)
- Generalist species (Berrebi et al., 2005; Verdiell-Cubedo et al., 2008; Franzoi et al., 2010; Chiti, 2017)

P. canestrinii



- First record for the study area
- High preference for coarse substrates (fine/medium gravel) in contrast with previous studies in the Venice Lagoon (Malavasi et al., 2005; Franco et al., 2006a; Franco et al., 2006d; Franzoi et al., 2010; Franco et al., 2012)
- Preference for unvegetated areas in agreement with literature (Malavasi et al., 2005; Franco et al., 2006a; Franco et al., 2006b; Franco et al., 2006d; Franzoi et al., 2010)
- Preference for low conductivity partially in agreement with literature (Kovačić et al., 2005a,b; Malavasi et al., 2005; Franco et al., 2006a; Franco et al., 2006d; Franco et al., 2012)

K. panizzae



- Slight preference for fine substrates in agreement with literature (Malavasi et al., 2005; Franco et al., 2006a; Franzoi et al., 2010; Marcelli et al., 2012a; Chiti, 2017)
- Slight preference for vegetation cover; previous findings are contrasting as some authors reported the species in unvegetated bottoms (Franzoi et al., 2010; Chiti, 2017) while other reported positive correlations with vegetation cover (Franco et al., 2012; Marcelli et al., 2012a)



Aggiornamento degli areali di distribuzione
di *Telestes souffia* e *Telestes muticellus*

Bertoli M., Manfrin C., Giulianini P.G., Pallavicini A., Pastorino P., Pizzul E.

Telestes muticellus e Telestes souffia



<i>Telestes</i>	<i>muticellus</i>	Vairone	LC		LC
<i>Telestes</i>	<i>souffia</i>	Suffia	NA		DD

Rondinini et al., 2022

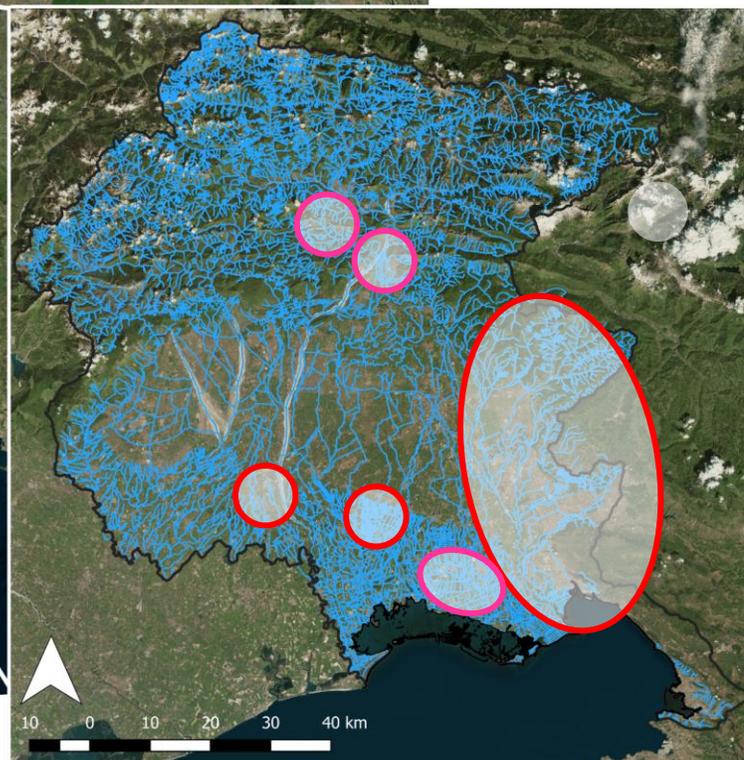
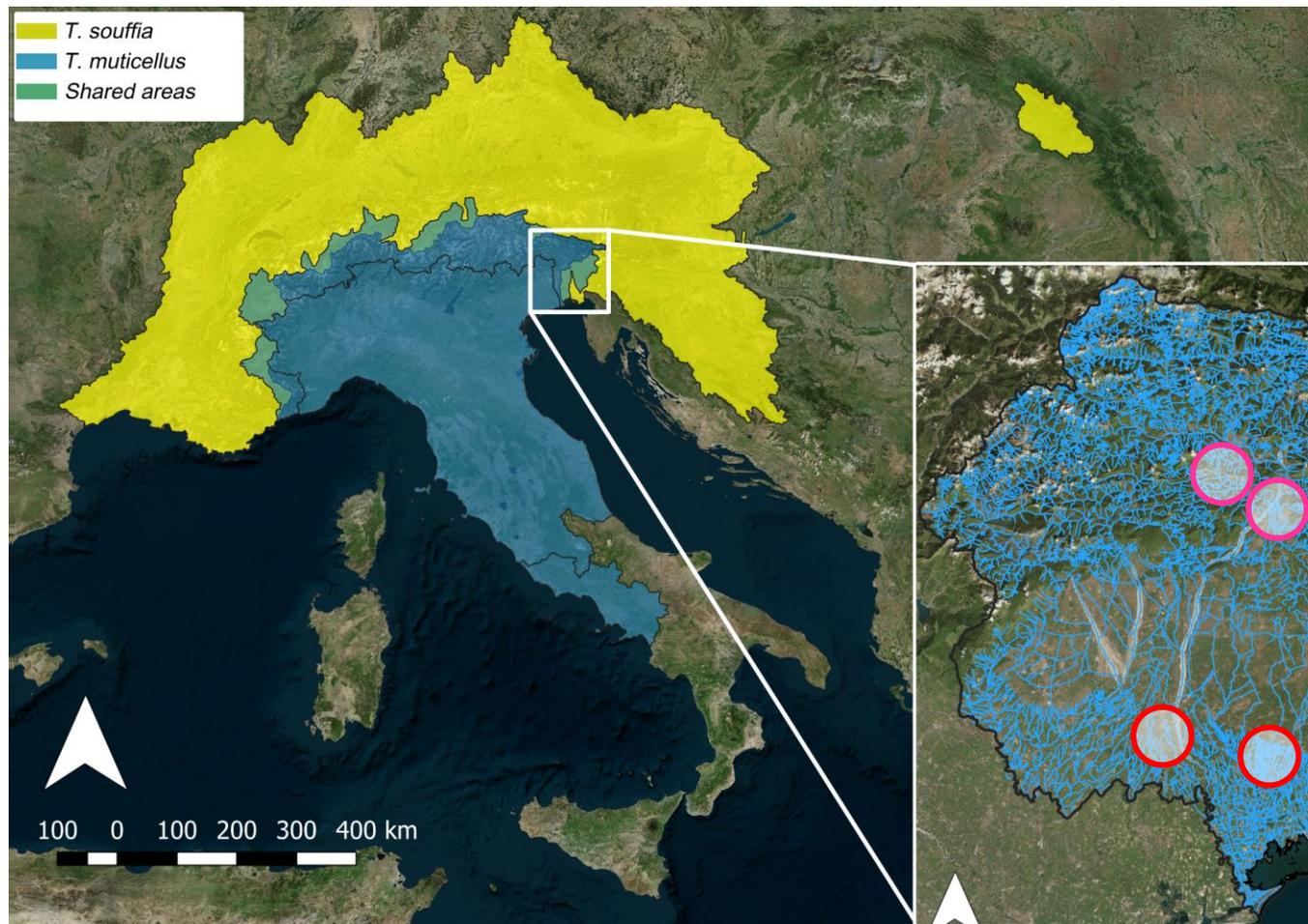
Vairone in Friuli Venezia Giulia

Vairone quasi assente dal FVG, presenza solo nel bacino Torre-Isonzo-Natisone

- Steindachner, 1861
- Gridelli, 1936
- D'Este 1978
- Specchi et al., 1980
- Stoch et al., 1992
- Marchetto et al., 2010

Presenza del vairone estesa ad altre rogge della bassa pianura e nel bacino del Tagliamento

- Pizzul et al., 2006
- Buj et al., 2017



Materiali e metodi

Campionamenti ittici



Prelievo di 20 esemplari per ciascuna stazione (primavera ed autunno 2022)

Analisi meristiche

Individuazione parametri da letteratura

- *Telestes souffia* (Vuković & Ivanović, 1971; Simonović, 2001; Keith & Allardi 2001; Kottelat & Freyhof 2007; Veličković et al., 2020)
- *Telestes muticellus* (Tortonese, 1970; Gandolfi et al., 1991)

Numero di scaglie lungo la linea laterale	LL
Numero di raggi della pinna anale	PA
Numero di raggi della pinna dorsale	PD
Numero di raggi della pinna pettorale	PP
Numero di raggi della pinna ventrale	PV
Numero di raggi della pinna caudale	PC
Numero di righe di scaglie sopra la linea laterale	SALL
Numero di righe di scaglie sotto la linea laterale	SBLL

Rilievo sugli esemplari

Analisi statistiche

- Test non parametrico di Kruskal Wallis
- Test di Conover-Iman (post-hoc)
- Non Metric Multidimensional Scaling (NMDS) + ANOSIM & SIMPER

Analisi genetiche

Estrazione e analisi mitocondriale

Identificazione mitocondriale (CytB)

Identificazione nucleare (RAG1)

Estrazione DNA

PCR marcatore mitocondriale e sequenziamento Sanger

Analisi bioinformatica delle sequenze e ricerca di similarità presso il database NCBI

T. souffia

T. muticellus

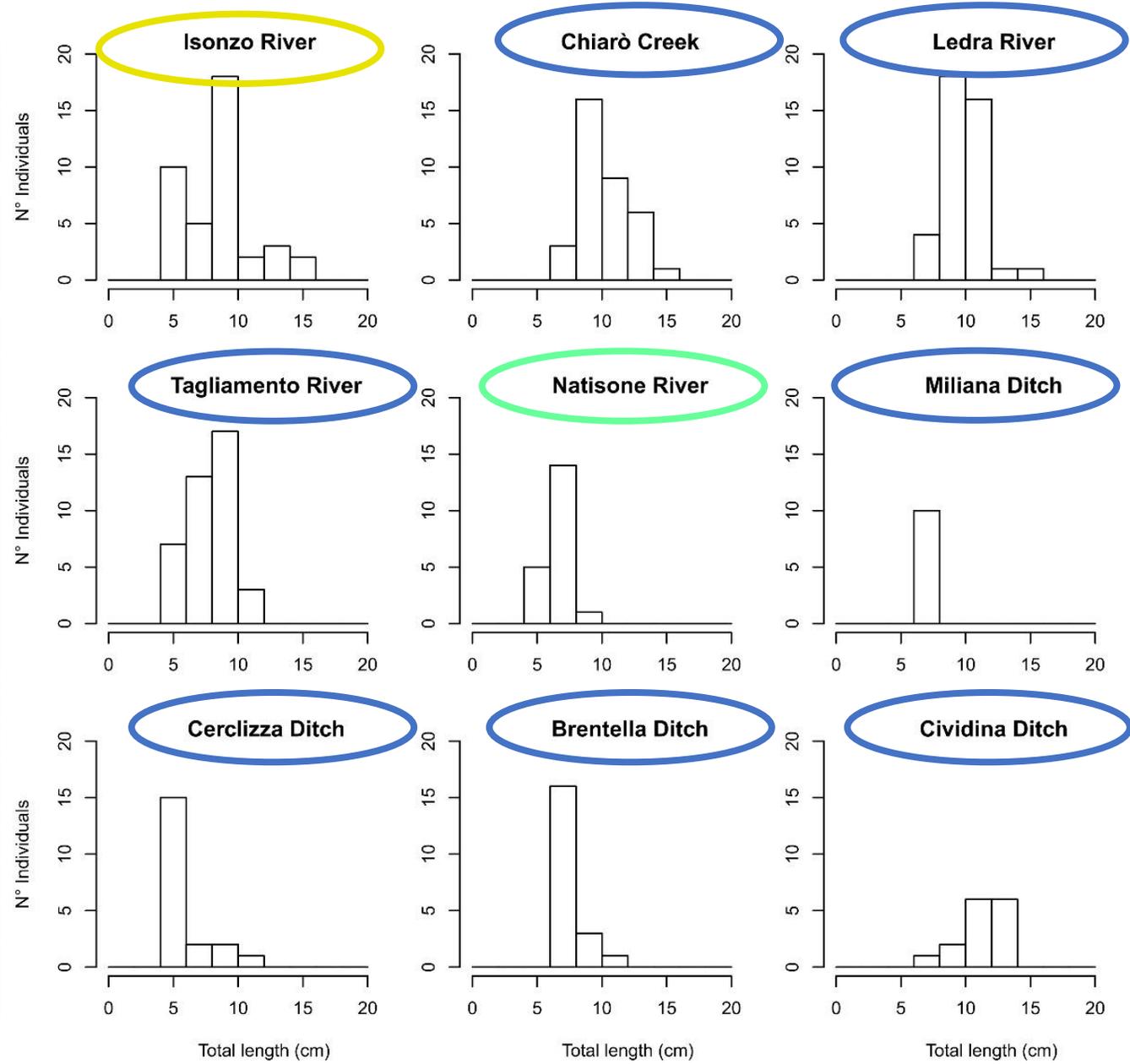
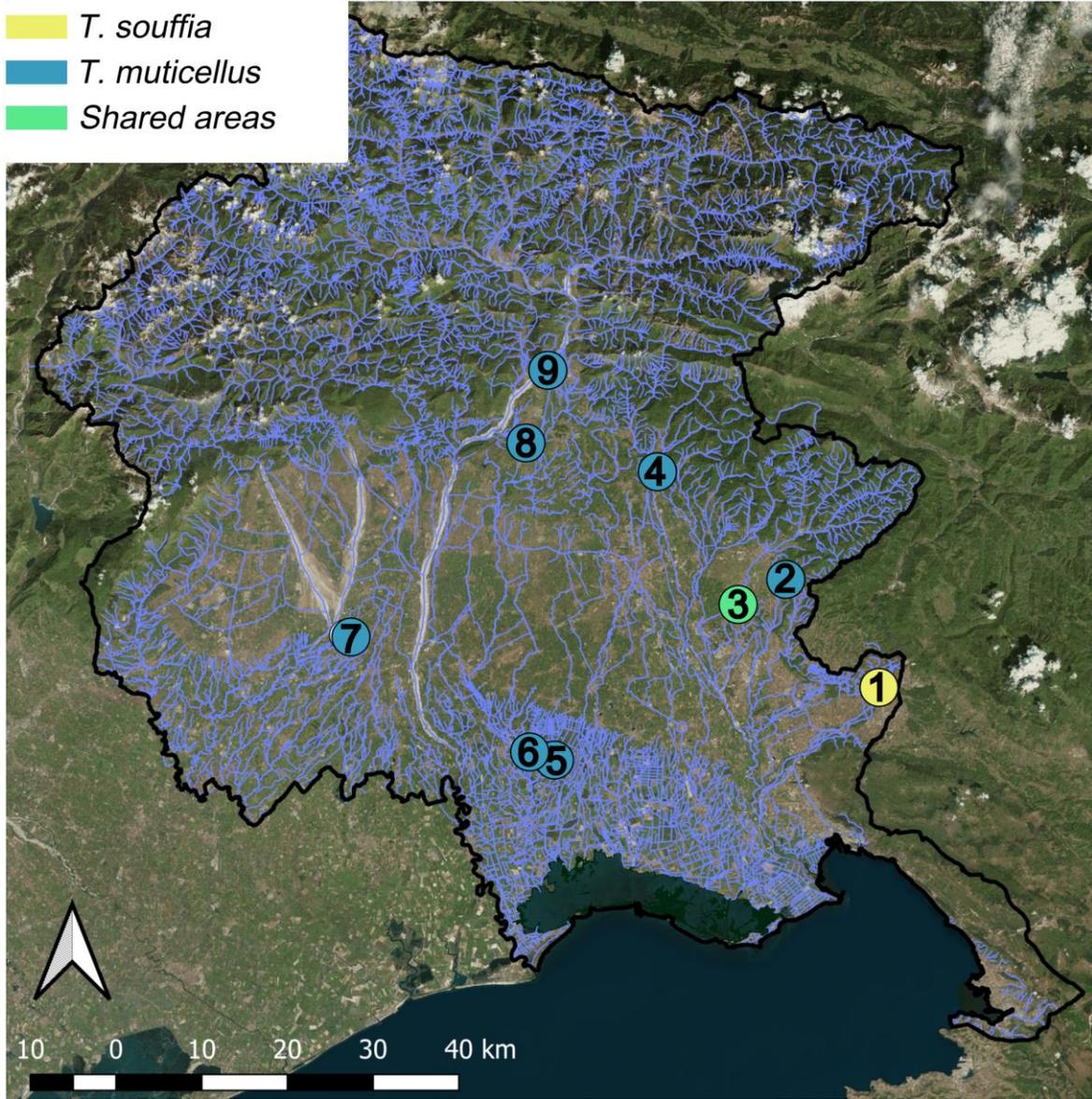
PCR marcatore nucleare e sequenziamento Sanger

Analisi bioinformatica delle sequenze e ricerca di similarità presso il database NCBI

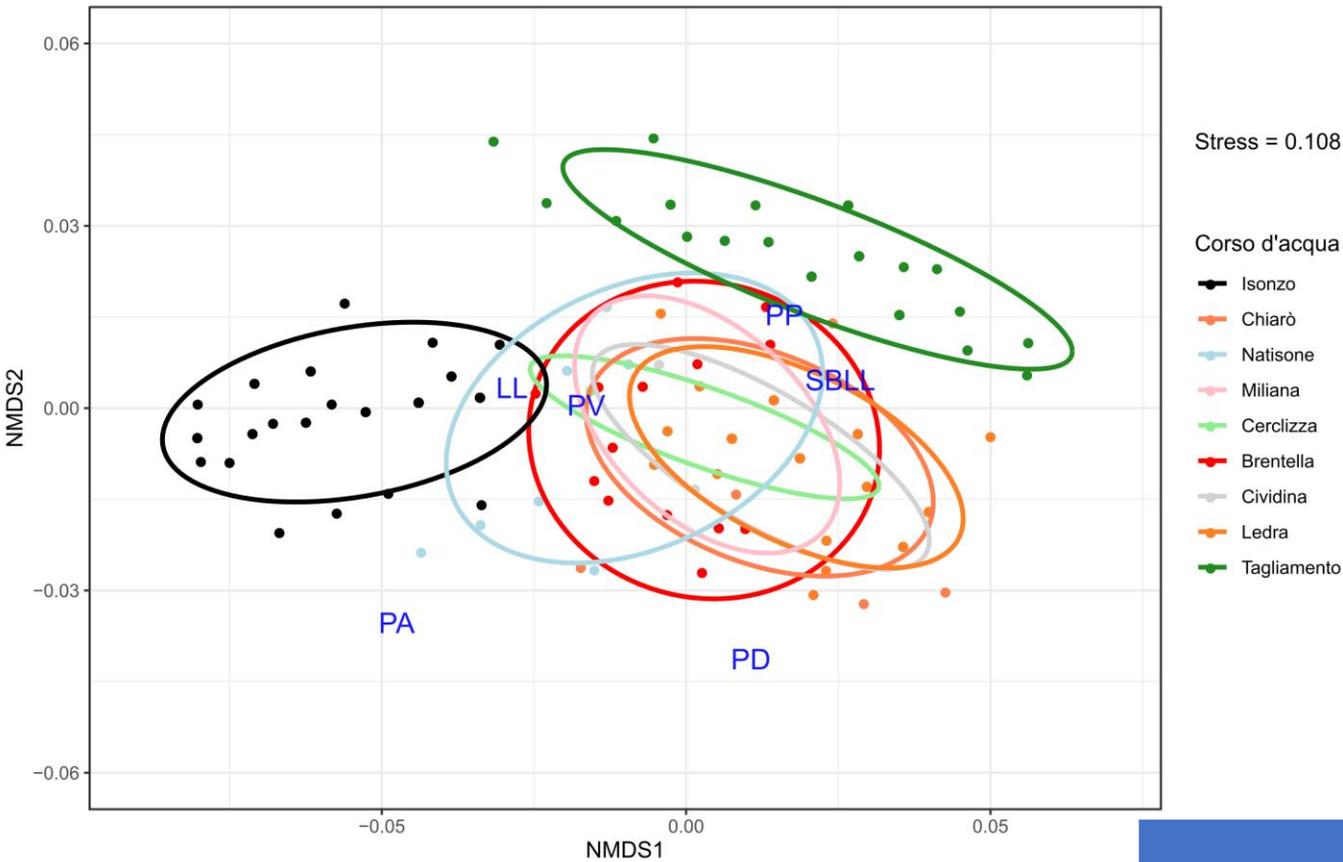
Assegnazione identità del campione per entrambi i marcatori

Risultati: popolazioni *Telestes* sp.

- *T. souffia*
- *T. muticellus*
- Shared areas



Risultati: indagini meristiche



Differenze significative per tutte le variabili
(Kruskal Wallis test: $H > 30.9$, d.f. = 8, $p < 0.001$)

ad eccezione di SALL e PC
(Kruskal Wallis test: $H < 11.0$, d.f. = 8, $p > 0.2$)

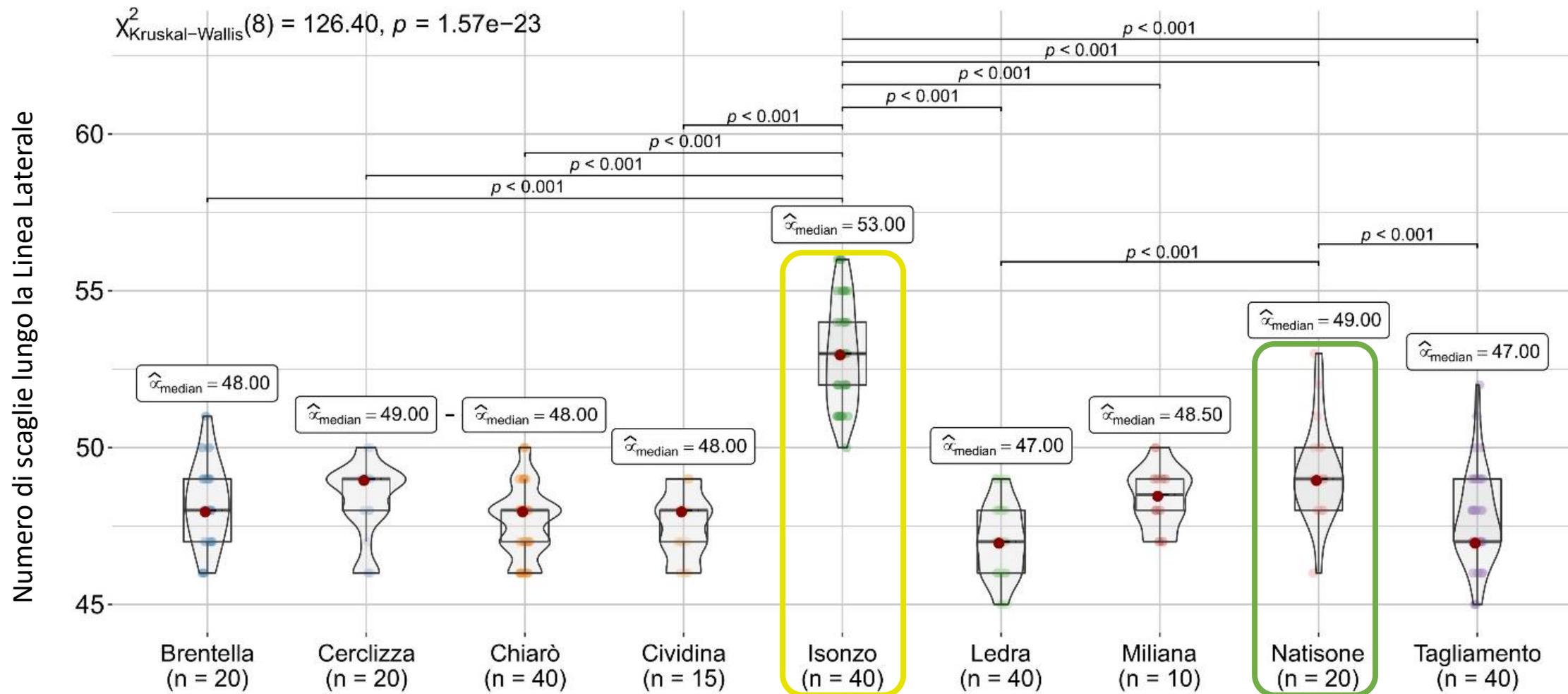


ANOSIM: $R_{statistic} = 0.615$, $p < 0.001$

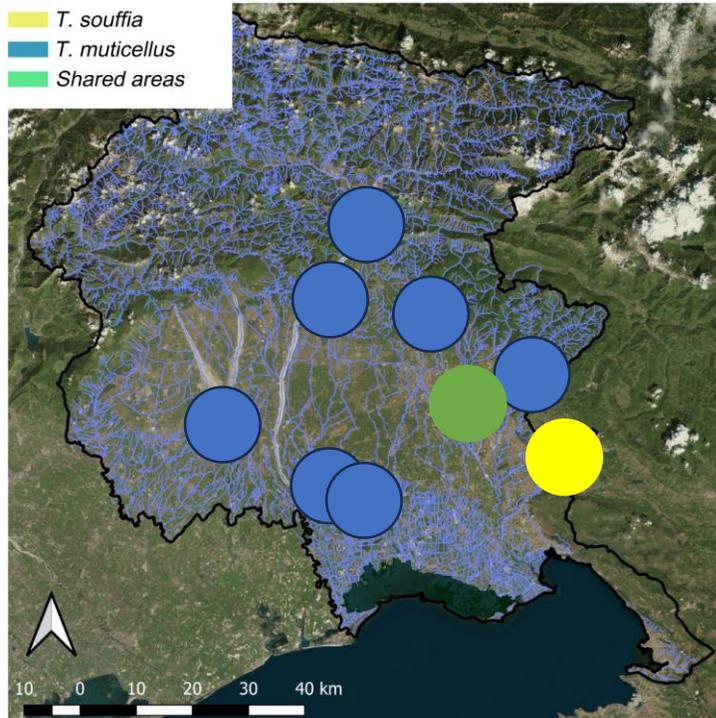


SIMPER				
Caratteri meristici	Codice	Average dissimilarity	Contribution %	Cumulative contribution %
Numero di scaglie lungo la linea laterale	LL	1.37	44.54	44.54
Numero di raggi della pinna anale	PA	0.62	20.37	64.91
Numero di raggi della pinna dorsale	PD	0.37	12.07	76.98
Numero di raggi della pinna pettorale	PP	0.35	11.31	88.28
Numero di raggi della pinna ventrale	PV	0.21	6.87	95.16
Numero di righe di scaglie sotto la linea laterale	SBLL	0.15	4.85	100.00

Risultati: indagini meristiche



Conclusioni e sviluppi futuri



- *Telestes souffia* risulta presente solo nel Fiume Isonzo
- *Telestes muticellus* è presente nel bacino del Tagliamento, nella bassa pianura friulana ma anche nel sistema Isonzo-Torre-Natisone



- Indagini volte a comprendere il possibile grado di ibridazione tra *T. muticellus* e *T. souffia*



- Estensione delle indagini ad altre specie di interesse comunitario presenti nell'area, in quanto zona di sovrapposizione degli areali di distribuzione di specie tipiche del distretto Padano-Veneto e organismi a distribuzione tipicamente balcanica (*Barbus balcanicus*)

Aggiornamento degli areali di distribuzione
di *Barbus* sp. nel Bacino dell'Isonzo,
con particolare riferimento a *Barbus balcanicus*, Kotlik et al., 2002



Barbus sp. quali specie in Friuli Venezia Giulia ???

Barbus plebejus Bonaparte, 1839



IUCN Red List (2022): VU

Barbus caninus Bonaparte, 1839



IUCN Red List (2022): EN

Barbus balcanicus Kotlik et al., 2002



IUCN Red List (2022): VU

Annexes II,V Habitat Directive 92/43/EEC

Barbus balcanicus e *Barbus caninus*

Barbo canino segnalato nel bacino Torre-Isonzo-Natisone

- Steindachner, 1861
- Gridelli, 1936
- Flego 1972
- Stoch et al., 1992
- Pizzul et al., 2002, 2006

Folia Zool. – 51(3): 227–240 (2002)

Two new *Barbus* species from the Danube River basin, with redescription of *B. petenyi* (Teleostei: Cyprinidae)

Petr KOTLÍK^{1,2,*}, Costas S. TSIGENOPOULOS³, Petr RÁB¹ and Patrick BERREBI⁴

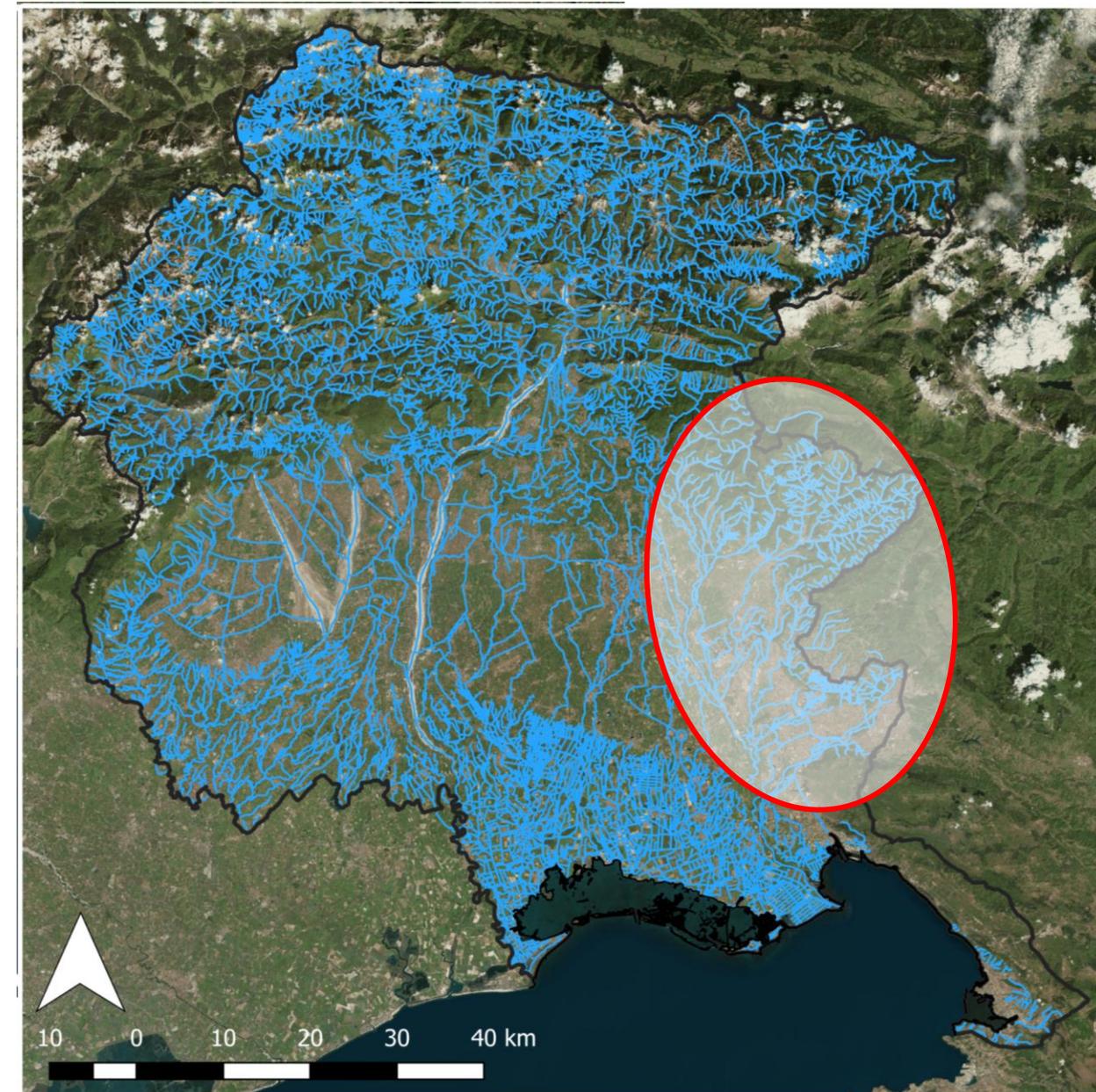
The European Zoological Journal, 2019, 280–293
Vol. 86, No. 1, <https://doi.org/10.1080/24750263.2019.1647298>

 Taylor & Francis
Taylor & Francis Group

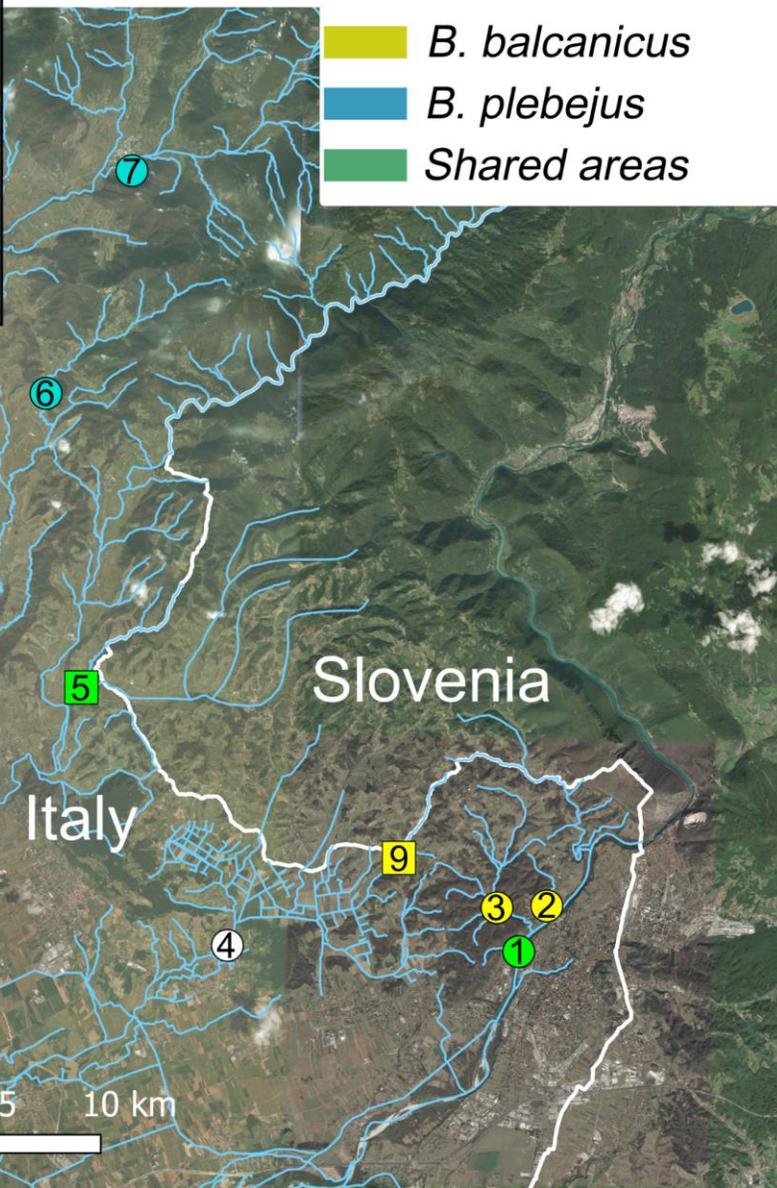
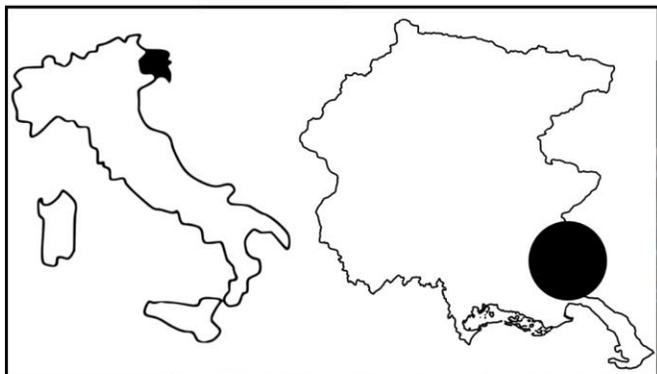
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Biology and distribution of Danube barbel (*Barbus balcanicus*) (Osteichthyes: Cyprinidae) at the Northwestern limit of its range

M. BERTOLI^{1§}, E. PIZZUL ^{1§}, V. DEVESCOVI¹, F. FRANZ¹, P. PASTORINO^{1,2},
P. G. GIULIANINI¹, C. FERRARI^{3*}, & F. NONNIS MARZANO³



Risultati: popolazioni *Barbus balcanicus* e *Barbus plebejus*

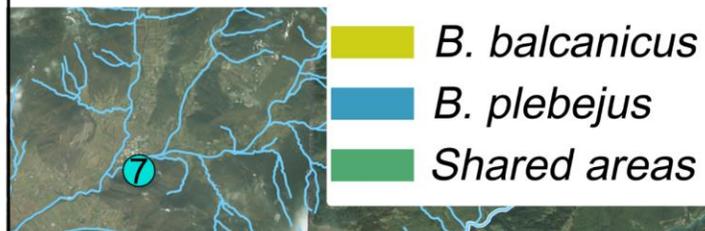
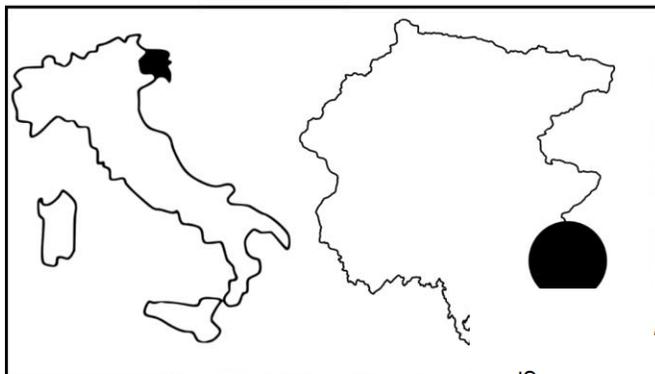


Site	Watercourse	Coordinates	
		Longitude	Latitude
1	Isonzo River	13.604039	45.948905
2	Groina Sream	13.597403	45.958295
3	Piuma Creek	13.611871	45.958747
4	Versa Stream	13.516885	45.949210
5	Reca Stream	13.471883	46.002364
6	Chiarò Creek	13.459667	46.063598
7	Alberone Stream	13.484210	46.110620
8	Natisone River	13.384925	46.037147
9	Barbucina Creek		

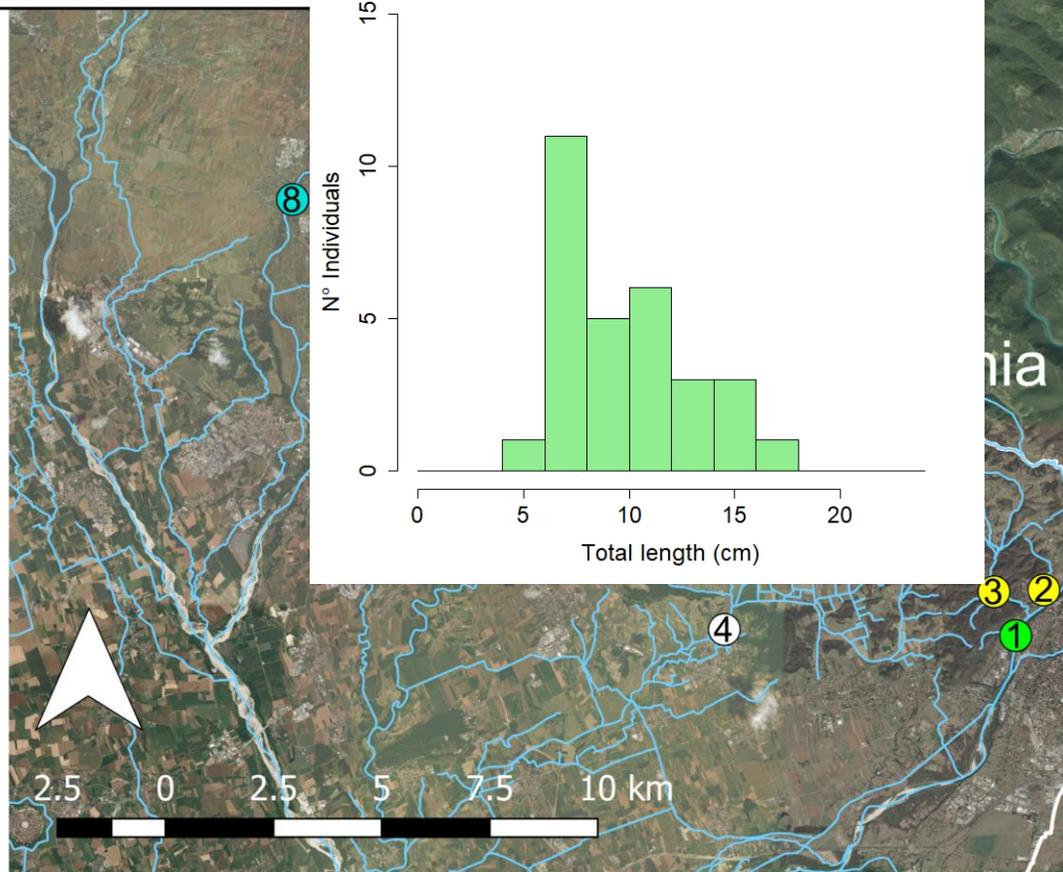
□ Bertoli et al., 2019

○ Bertoli et al., 2025 (waiting for it....)

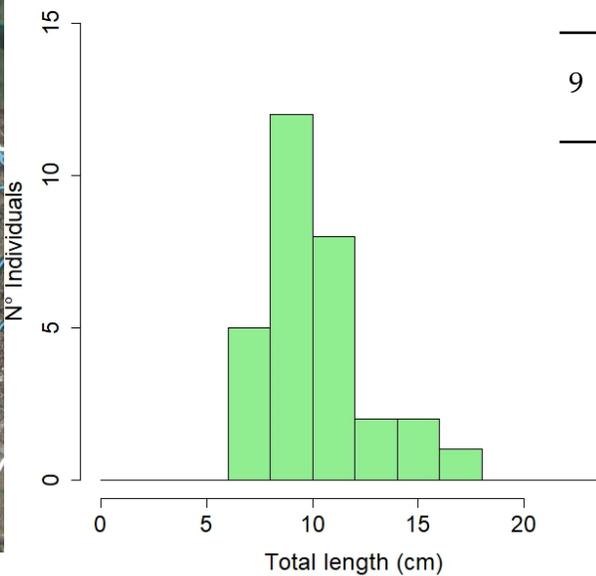
Risultati: popolazioni *Barbus balcanicus* e *Barbus plebejus*



Barbus balcanicus (Piuma Creek)

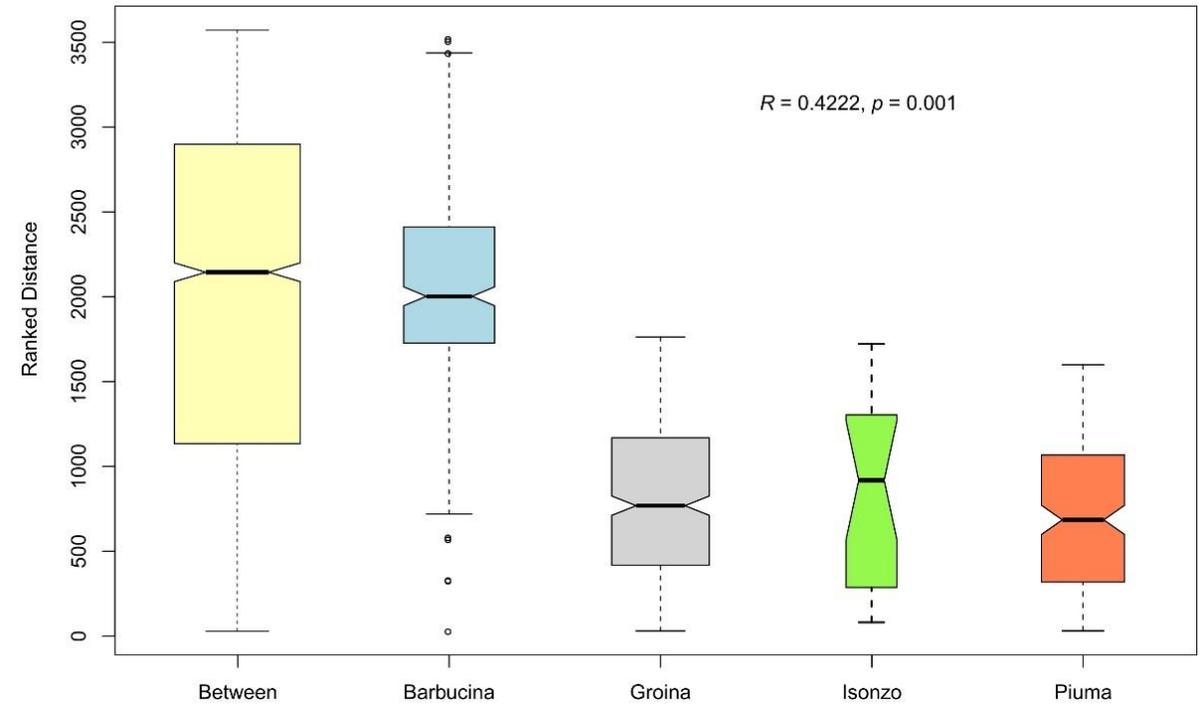
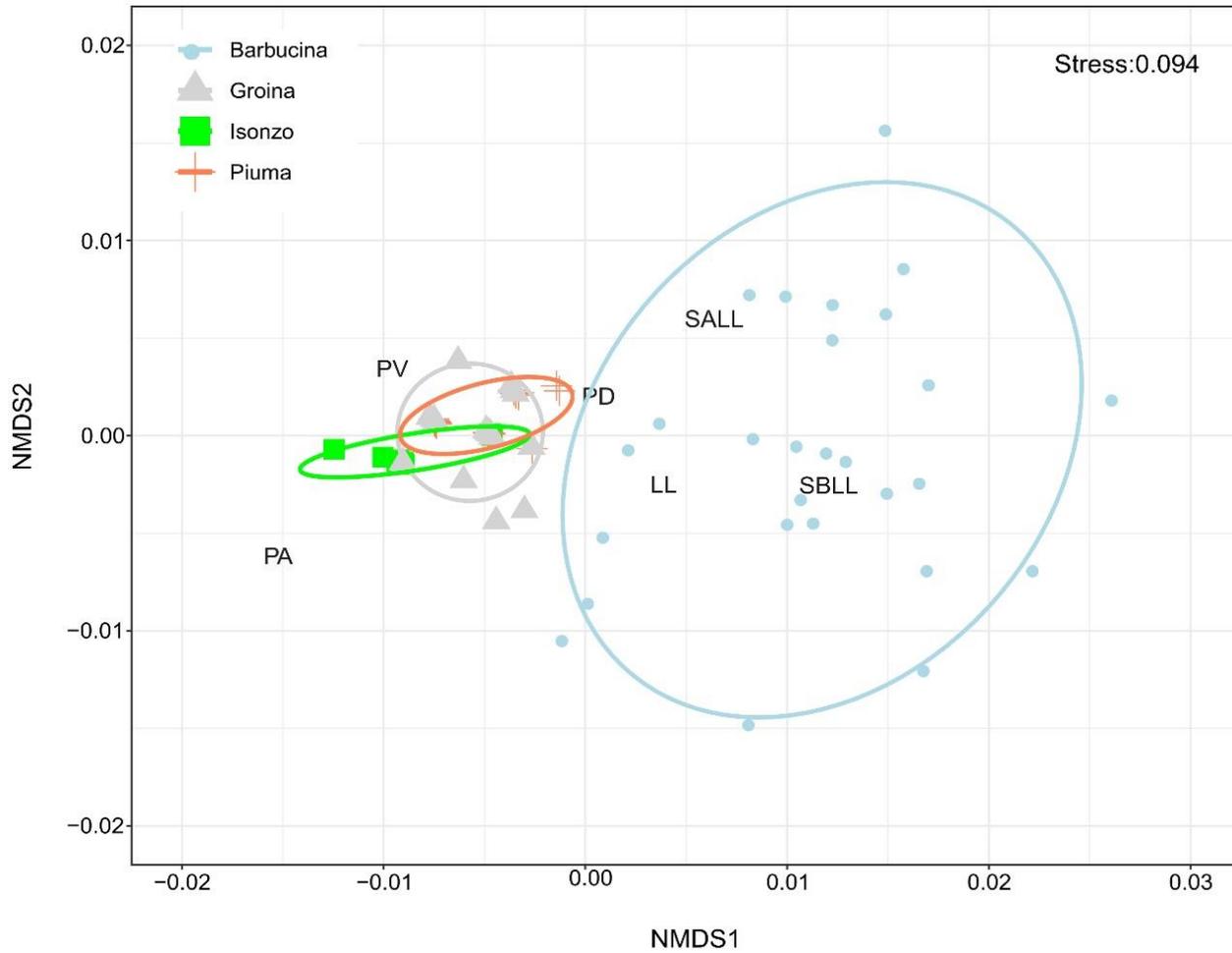


Barbus balcanicus (Groina Stream)



Site	Watercourse	Coordinates	
		Longitude	Latitude
1	Isonzo River	13.604039	45.948905
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7	Alberone Stream	13.484210	46.110620
8	Natisone River	13.384925	46.037147
9	Barbucina Creek		

Risultati: meristica *Barbus balcanicus*



ANOSIM $R_{\text{statistic}}: 0.422, p < 0.001$

Meristic Characters	Code	Average Dissimilarity	Contribution %	Cumulative Contribution %
Number of lateral line scales	LL	1.389	35.48	35.48
Number of rays in anal fin	PA	0.7236	18.48	53.97
Number of scales below the lateral line	SBLL	0.6658	17.01	70.98
Number of scales above the lateral line	SALL	0.5177	13.23	84.2
Number of rays in ventral fin	PV	0.5121	13.08	97.29
Number of rays in dorsal fin	PD	0.1062	2.714	100

Conclusioni e sviluppi futuri



- *B. caninus* risulta NON presente nel bacino del Fiume Isonzo, precedenti osservazioni sono da ritenere attribuzioni non corrette, dovute al fatto che *B. balcanicus* non era ancora stata definita come specie

- *B. balcanicus* è presente nel bacino dell'Isonzo, dove convive (in alcuni corsi d'acqua) con *B. plebejus*



- Indagini volte a comprendere la variabilità nelle popolazioni, che può essere indotta anche da pressioni dovute a inquinamento
- Indagini volte a verificare se *B. caninus* sia presente nei bacini del Tagliamento e/o della Livenza (estensione dell'areale verso est, dovuto alle transfaunazioni)





**Ecological preferences of the south european nase lasca
(*Protochondrostoma genei*, Bonaparte 1939)
in the Chiarò di Cialla Creek (Northeast Italy):
new insights and conservation perspectives**

**Marco Bertoli, Davide Lesa, Giacomo Rossi, Giovanni Negro, Beatrice Pinna, Simone Forte, Alessandro Guglielmetto,
Massimo Zanetti, Paolo Veza, Elisabetta Pizzul**

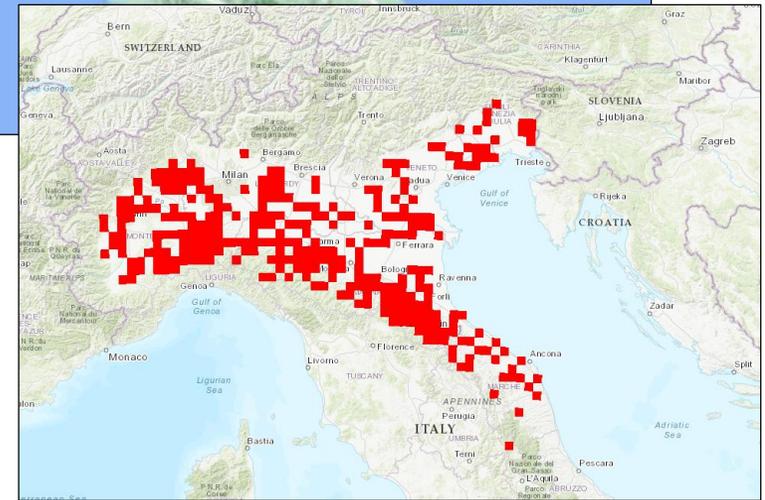
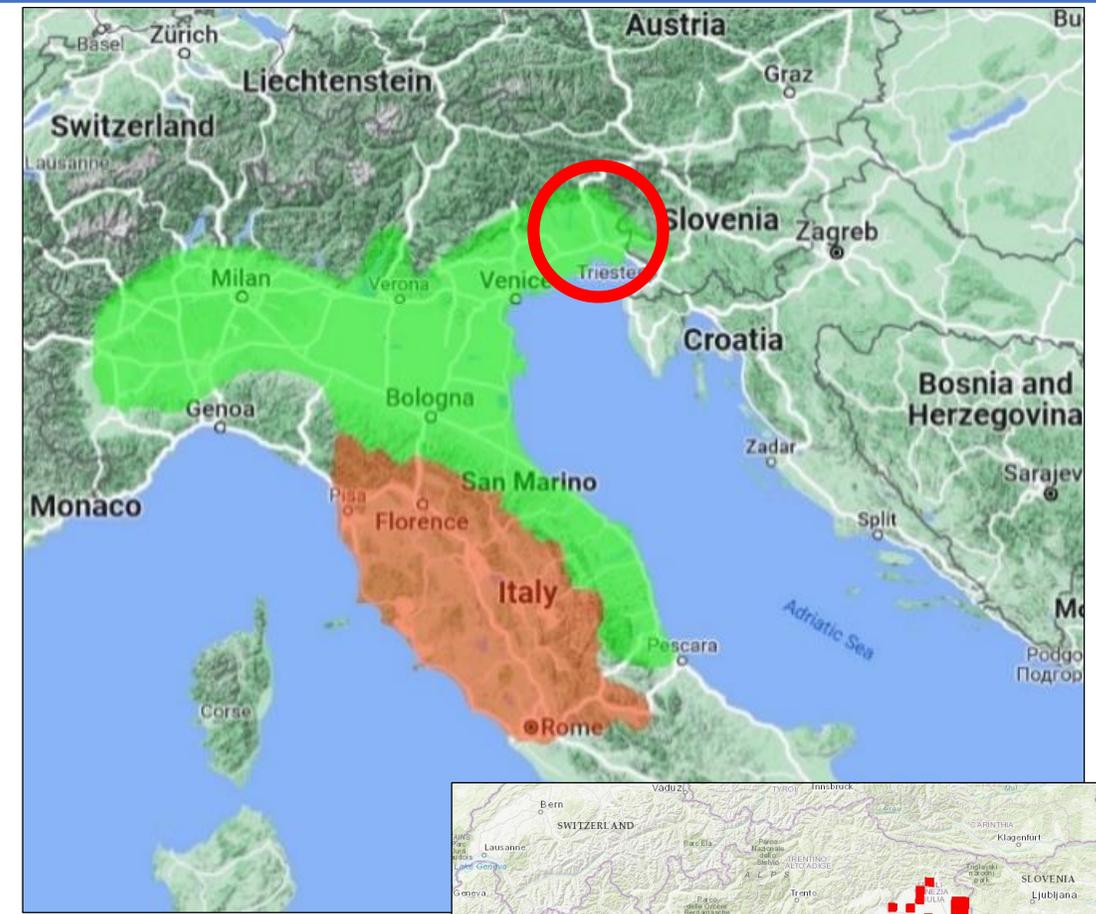


Target species: the south European nase (lasca)

Protochondrostoma genei, Bonaparte 1939



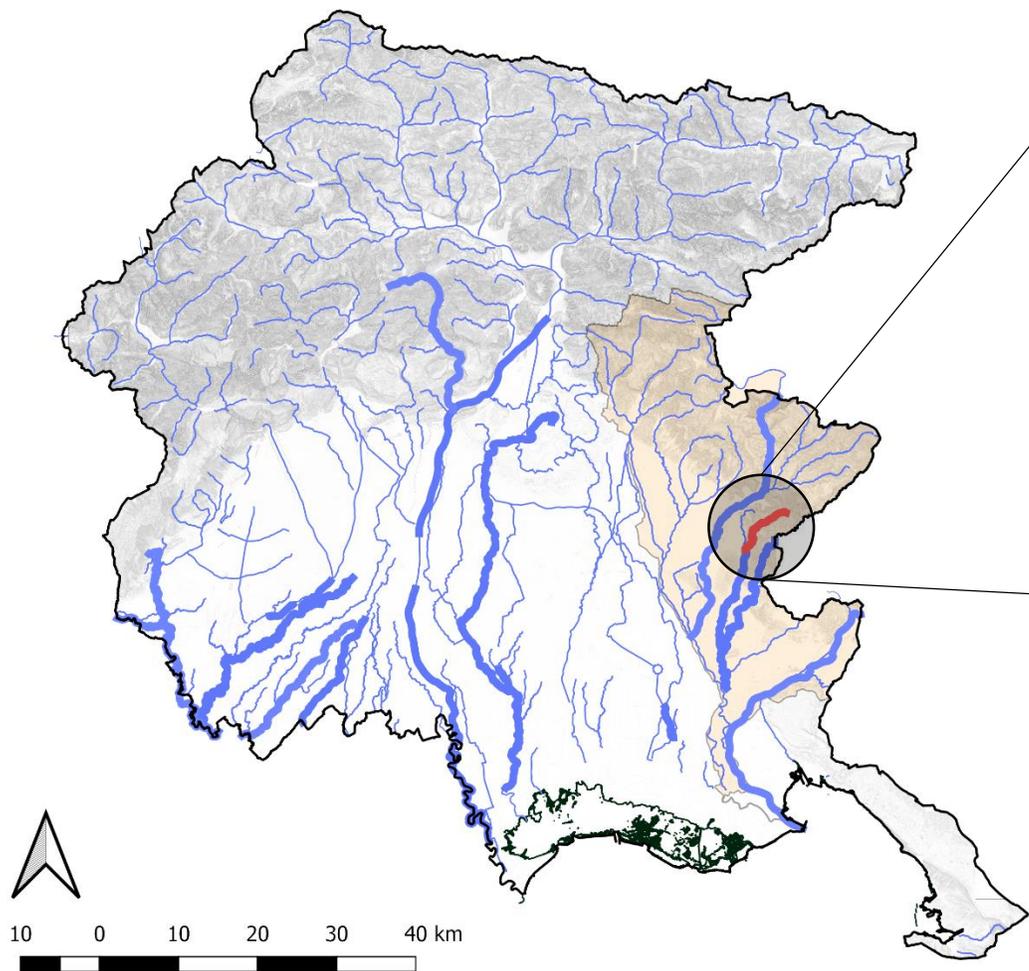
- endemic in Italy (formerly present in the Northern portion of the peninsula and in Adriatic side of Central Italy)
- Introduced in the Tyrrhenian side (Liguria, Tuscany and Lazio) due to introductions related to fisheries purposes
- included in the Annex II of the European Habitat Directive 92/43/EEC



Protochondrostoma genei Lasca EN

Red List of the Italian vertebrates (Rondinini et al., 2013; 2022)

Study area: the Chiarò di Cialla Creek

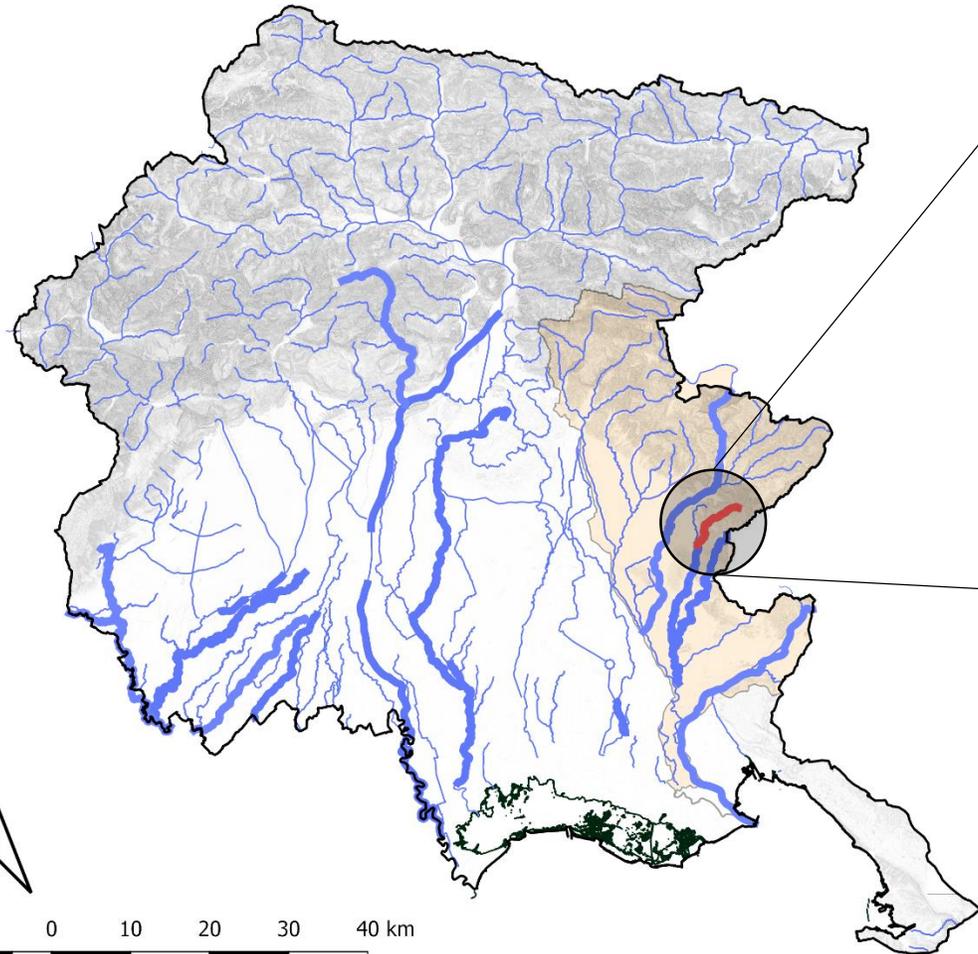


Chiarò di Cialla Creek

- Originates in the Prepotto Municipality, approximately at 600 m a.s.l.
- 9.85 Km length
- Joins with the Rug Creek, originating the Corno Stream

The Chiarò di Cialla Creek was purposed as a new **Site of Community Importance (pSCI - IT3320041)** by the Regional Authorities of Friuli Venezia Giulia (DGR 816 – June 6, 2022), with the aim to improve the conservation of *Protochondrostoma genei*

Study area: the Chiarò di Cialla Creek



Common nase *Chondrostoma nasus*

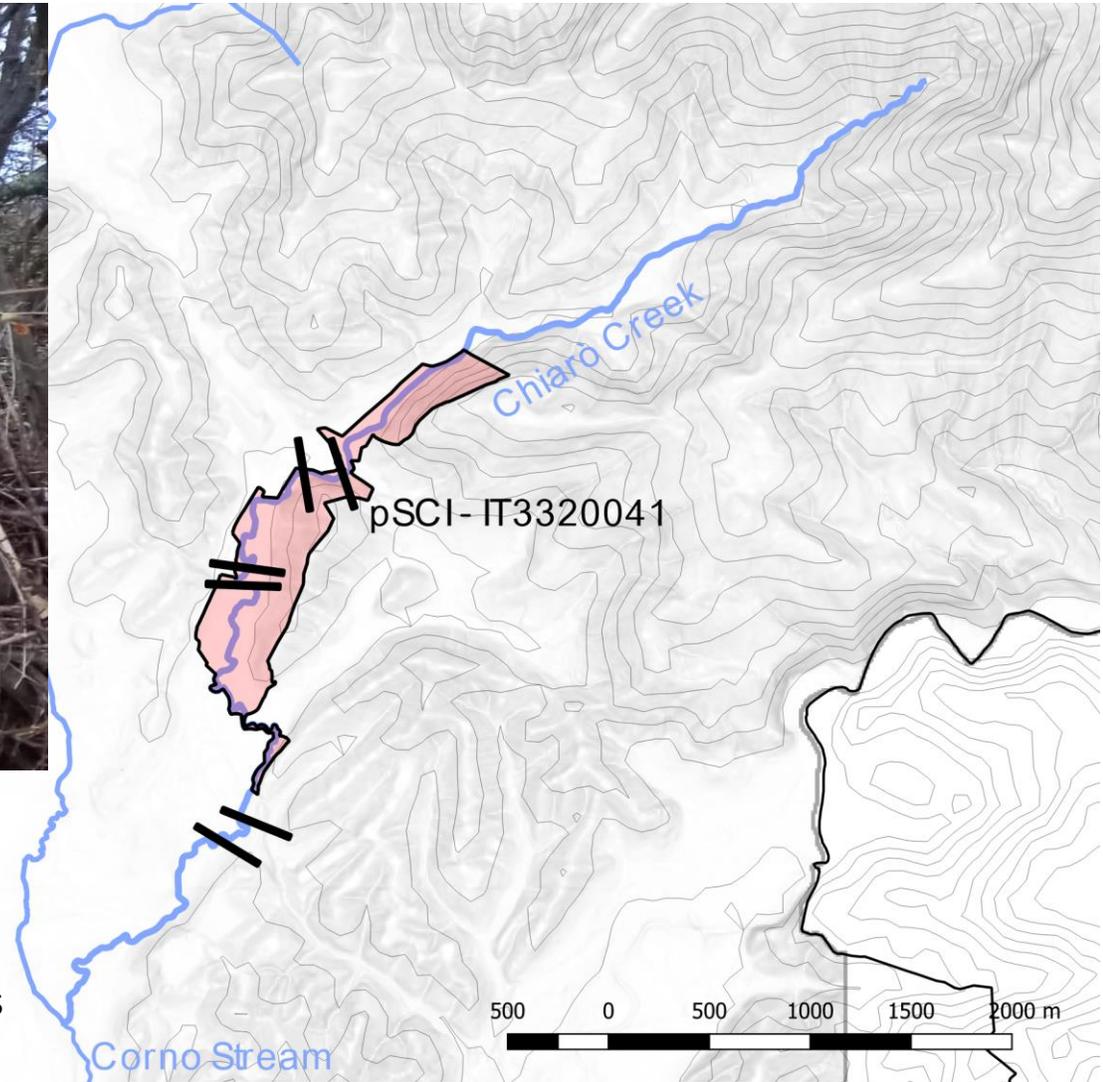


Brown trout *Salmo trutta*



The Chiarò di Cialla Creek was purposed as a new **Site of Community Importance (pSCI - IT3320041)** by the Regional Authorities of Friuli Venezia Giulia (DGR 816 – June 6, 2022), with the aim to improve the conservation of *Protochondrostoma genei*

Monitoring activities: 2021 – 2022 sampling campaign



MESOHABSIM Project (September 2021 – May 2022)

- Identify of the main habitats for different life-history stages
- Analyze the habitat preferences in relation to different hydrological conditions
- Identify the main features for proper management and conservation



Autorità di bacino distrettuale delle Alpi Orientali



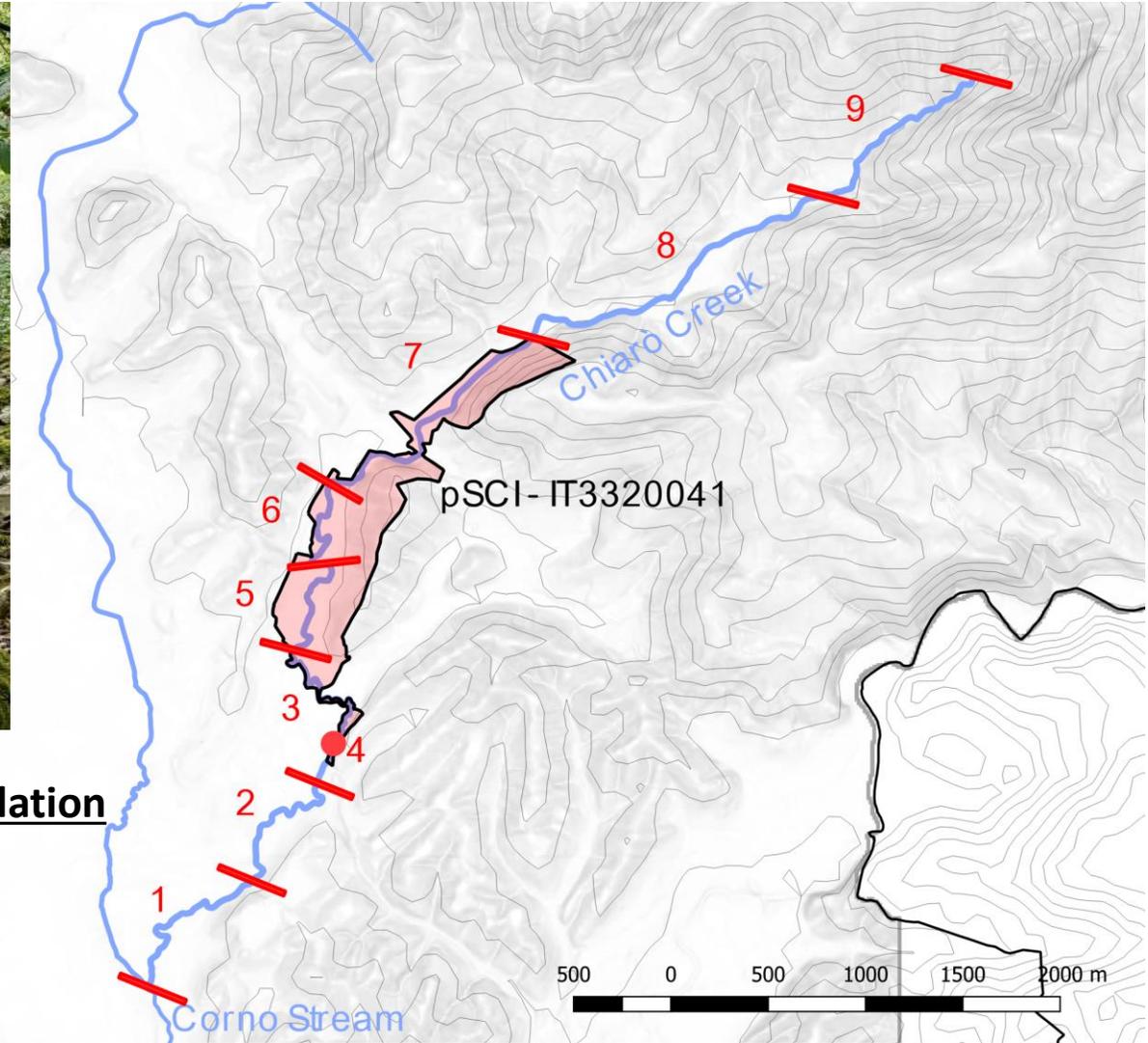
Politecnico
di Torino

Dipartimento di Ingegneria
dell'Ambiente, del Territorio e
delle Infrastrutture



DIPARTIMENTO DI
SCIENZE DELLA VITA

Monitoring activities: 2023 - 2024 sampling campaign



C. nasus eradication Project and monitoring of the *P. genei* population (ongoing project)

- Whole watercourse has been monitored
- Time period before *C. nasus* and *C. genei* reproduction



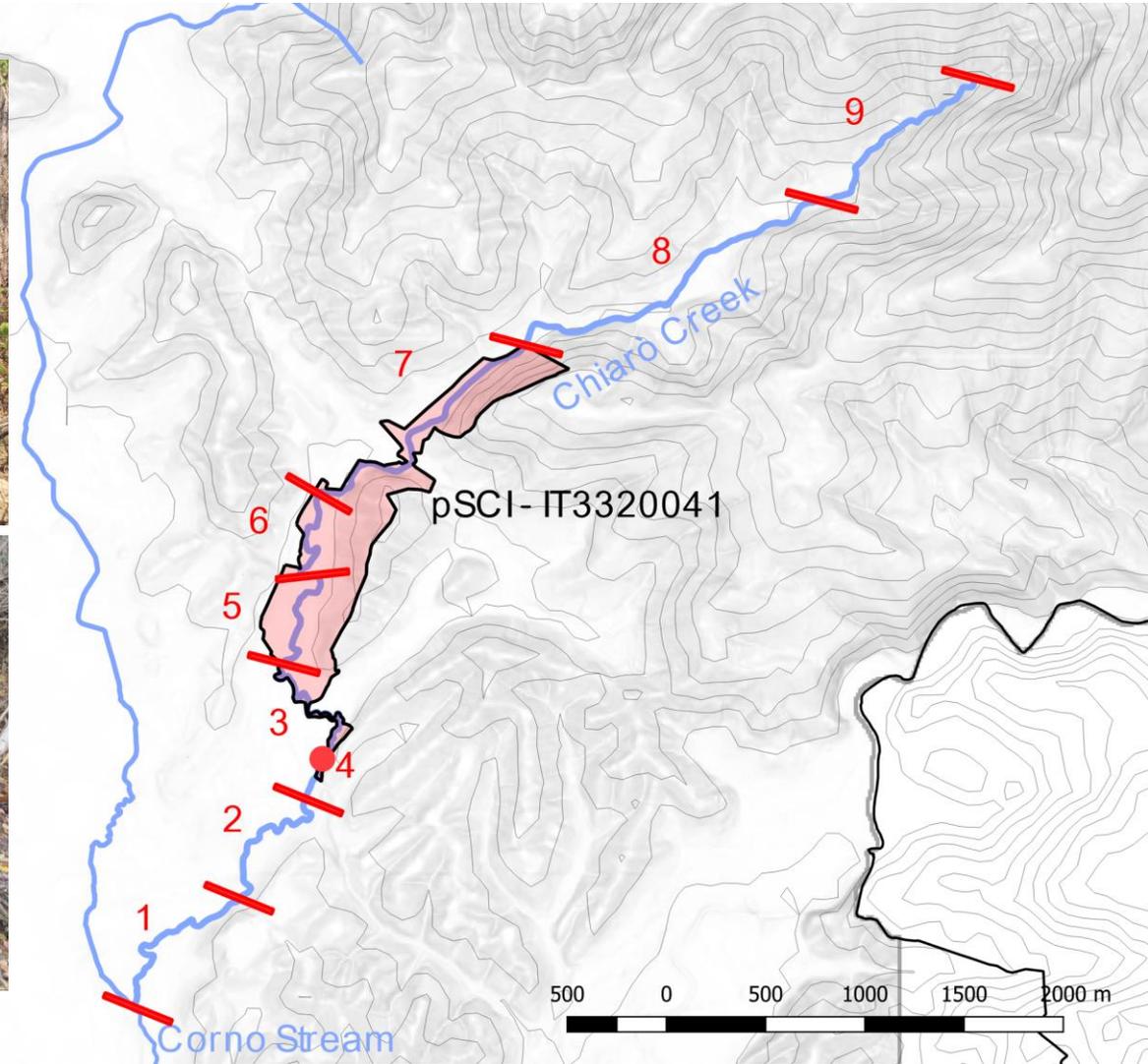
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Ente Tutela
Patrimonio
Ittico



Monitoring activities: 2023 - 2024 sampling campaign



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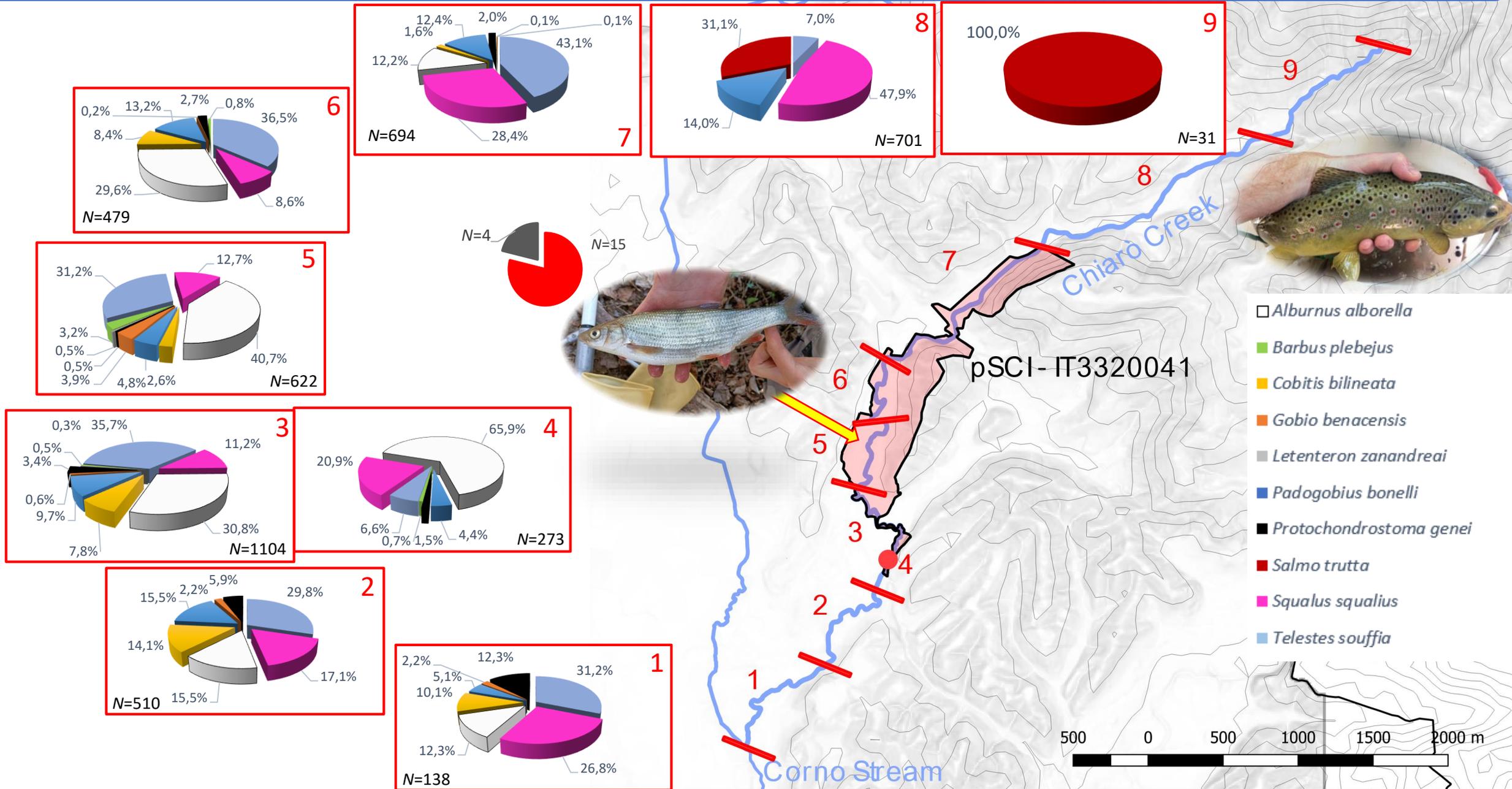


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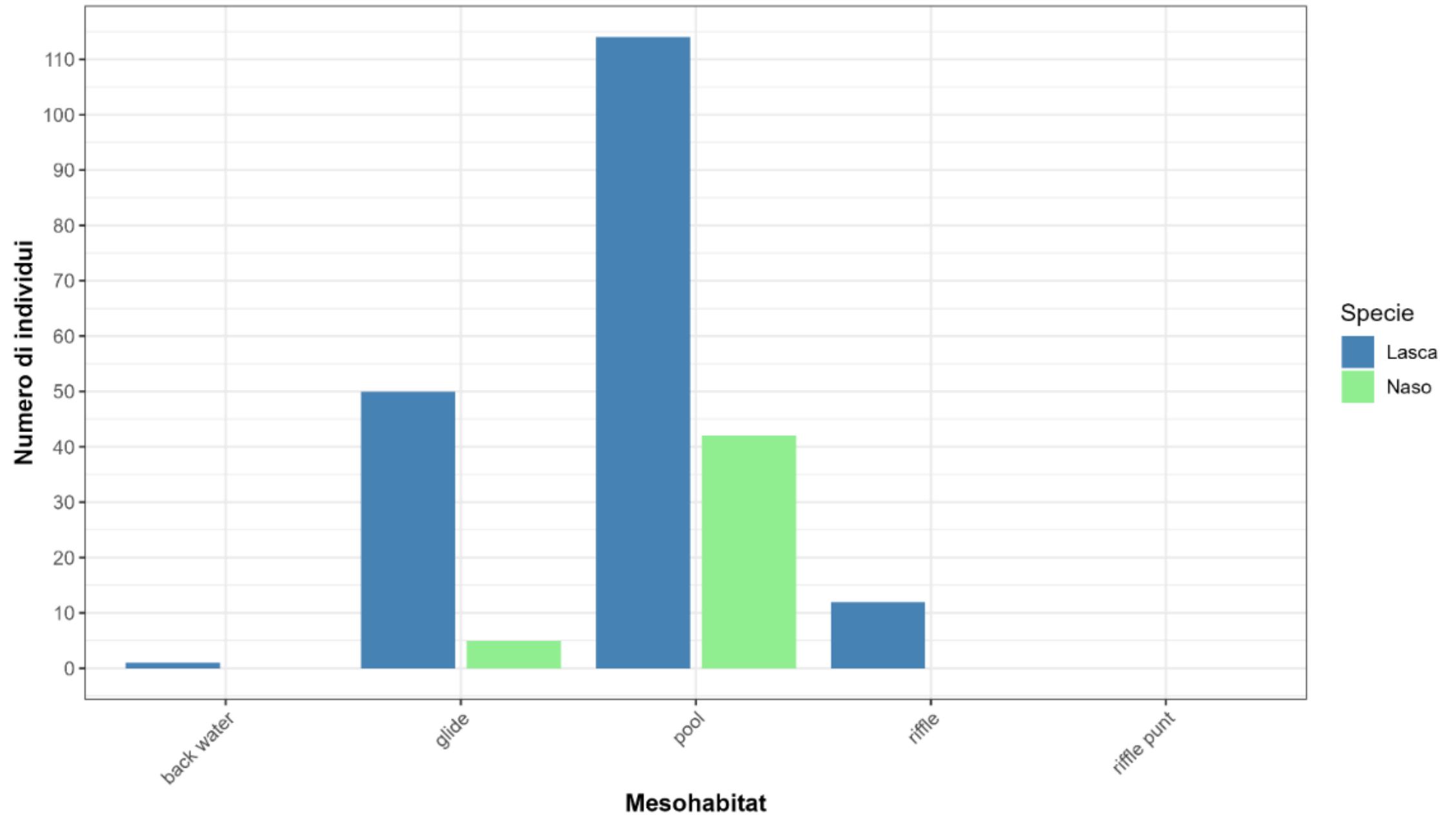


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Results: second sampling campaign (March – May 2023), community composition



Last results: habitat occupation (2024)



Conclusions

Findings:

- Juvenile preferences (usually not reported in the existing literature for the lasca) (Zerunian, 2004; Kottelat & Freyhof, 2007)
- Our data confirmed some information reported in the context of the LIFE for LASCA about habitat preferences

NEXT STEPS (ongoing actions):

- Construction of preference curves (Mesohabsim project)
- Eradication (population control) of *Chondrostoma nasus*
- Eradication (population control) of *Salmo trutta*