

# *River runs dry:* Movement patterns of *Telestes muticellus* (Cypriniformes: Leuciscidae) in an intermittent river stretch

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XL

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



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Leibniz Institute of Freshwater Ecology  
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**RIBES**

# Objectives



Assessment of survival and movement of fish living in intermittent reach



Comparison of movement with fish living in hydrological different river section

# Focal species

Italian riffle dace



Order: Cypriniformes  
Family: Leuciscidae  
Genus: Telestes  
Species: *Telestes muticellus* (Bonaparte, 1837)

*Photo by: Mattia Nocchiola*



Perennial river stretch

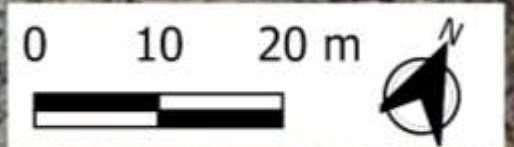
Intermittent river stretch

## Research site

Rio Morzone

Appennine mountain stream

North of Italy - Piedmont region



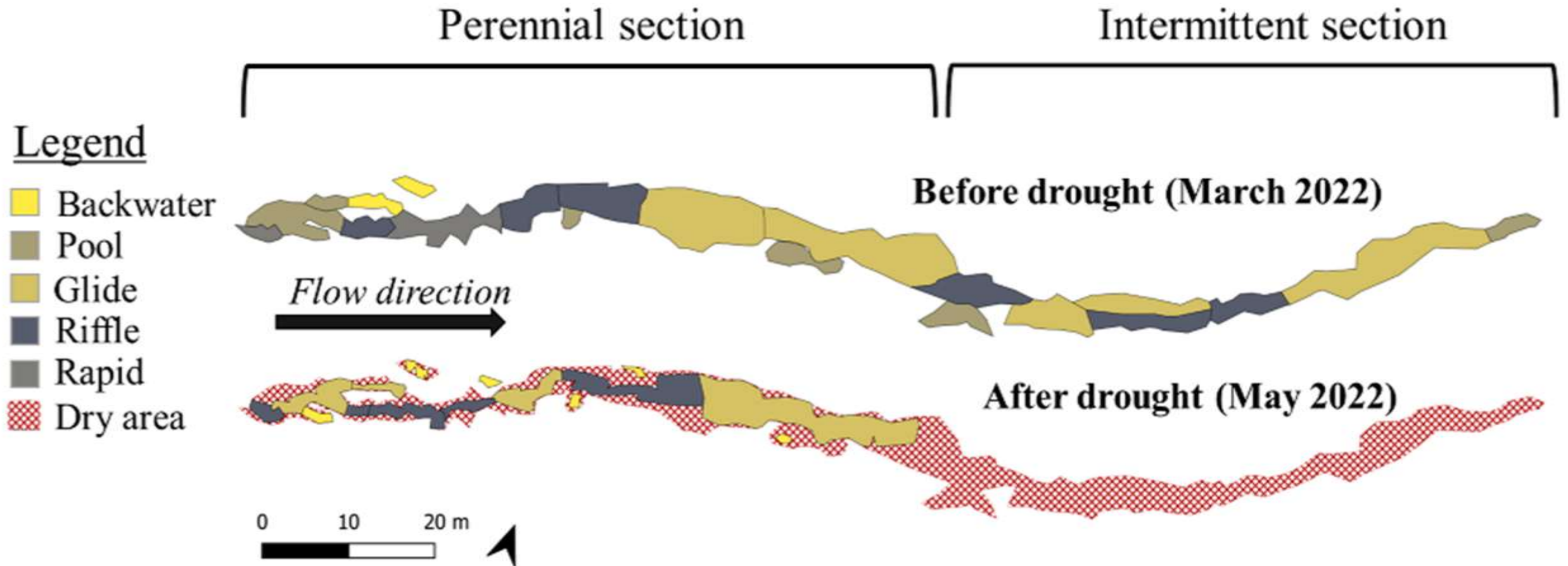
Intermittent river stretch

Perennial river stretch

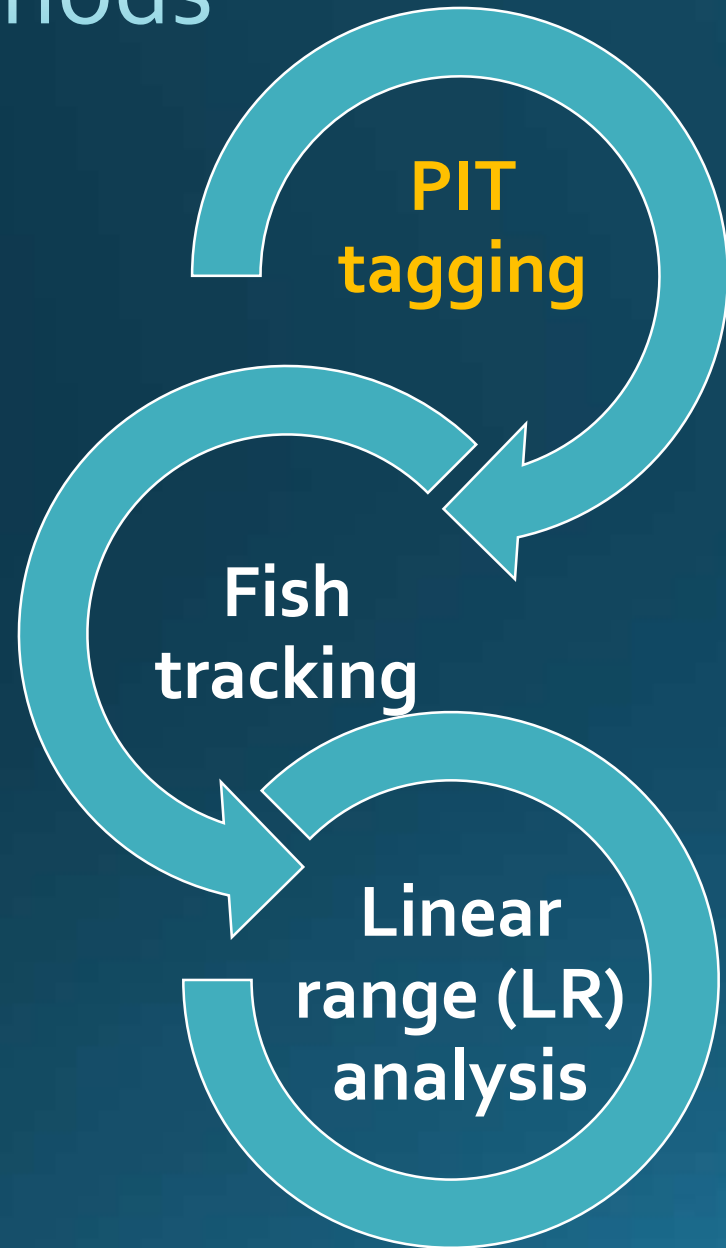


# Research site

## Hydromorphological characterization and drying pattern



# Methods



## *PIT Telemetry*

Tracking fish in natural stream

Electronic tagging technology (*Radio Frequencies IDentification*) for tracking/positioning animals in underwater ecosystems

Tagged fish (n = 200)  
size > 60mm



Passive integrated transponder



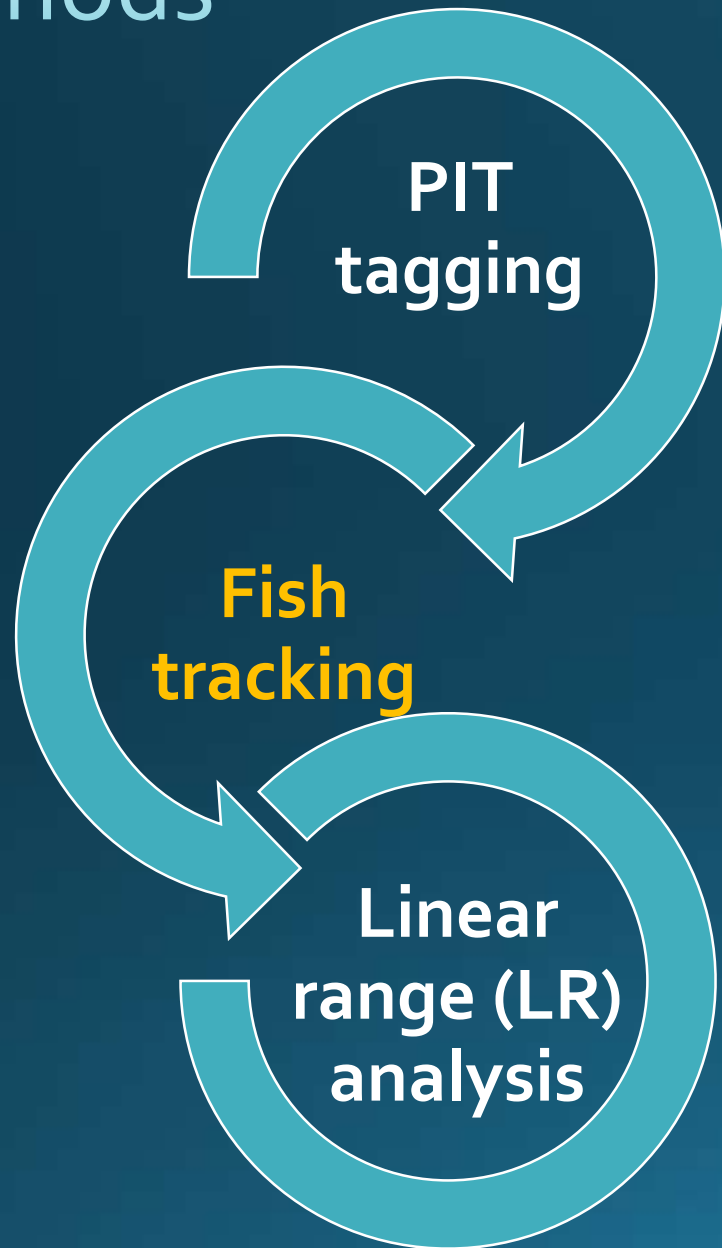
12mm



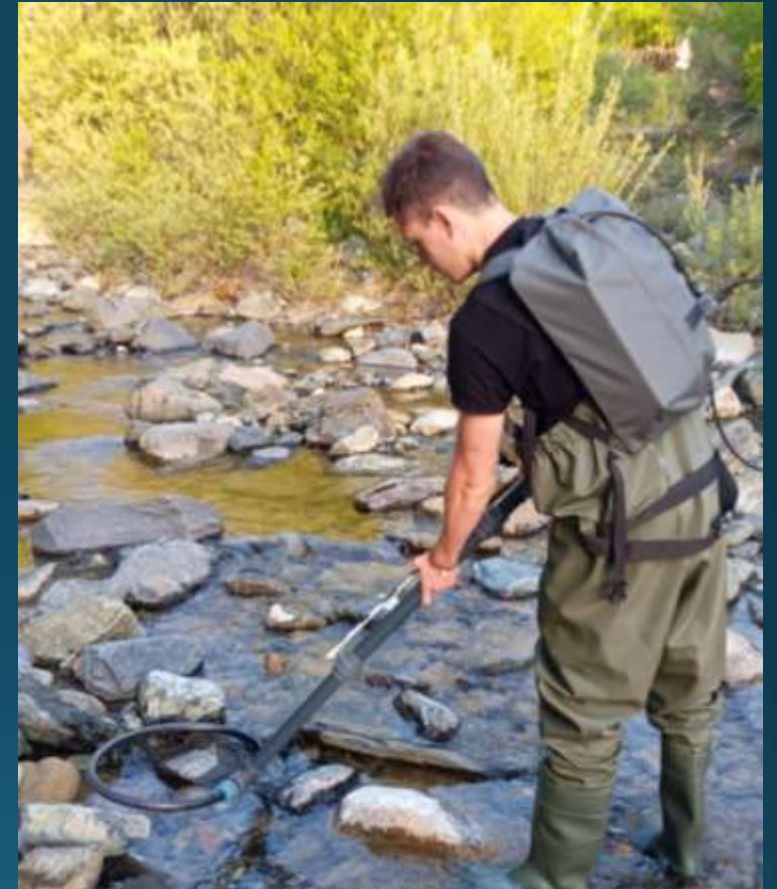
Suitable technique for *T. muticellus*

Schiavon et al., (2023). Survival and swimming performance of a small-sized Cypriniformes (*Telestes muticellus*) tagged with passive integrated transponders. *Journal of Limnology*, 82.

# Methods



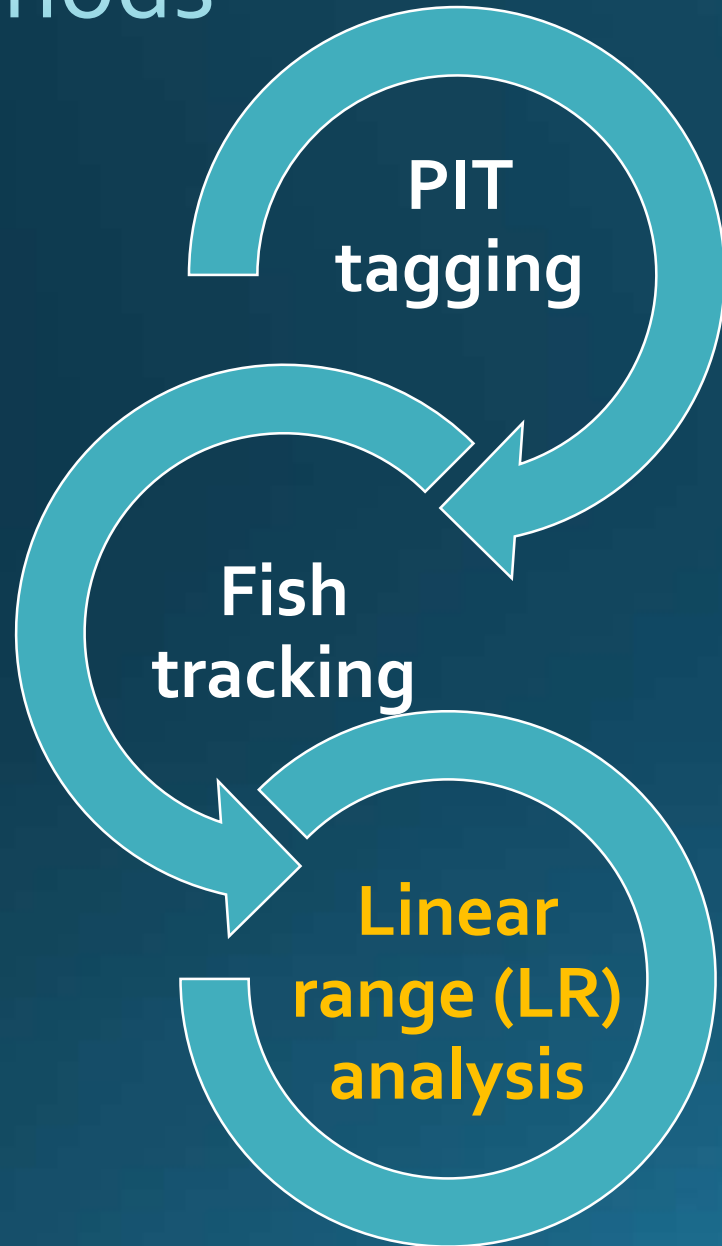
## *Tracking in the river*



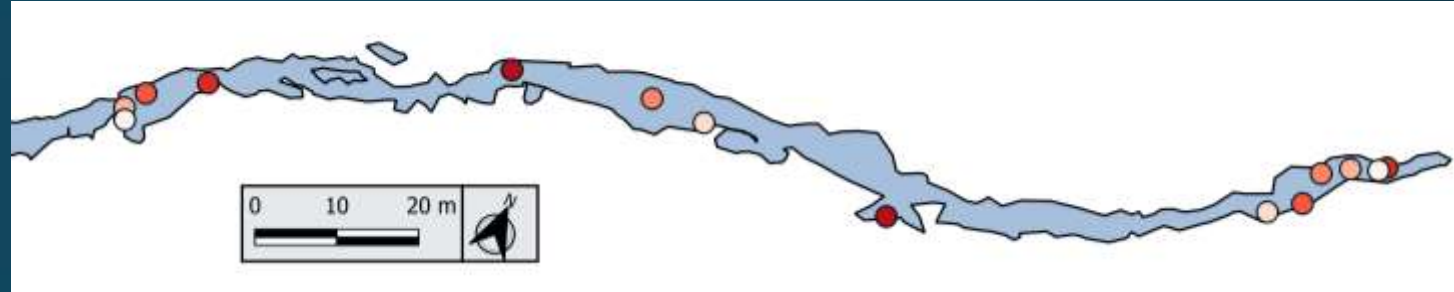
19 Tracking events from April 4<sup>o</sup> to  
Septemebr 26<sup>o</sup> 2022



# Methods



## *Example of positioning of fish*



LR represents the difference between upstream and downstream positions

Linear range calculated via Linear Referencing System (LRS)

# Results

17 fish tracked in the study reach

Perennial stretch

n = 9 fish  
Length;  $\bar{x} = 73$  mm,  $\sigma = 4$  mm

Intermittent stretch

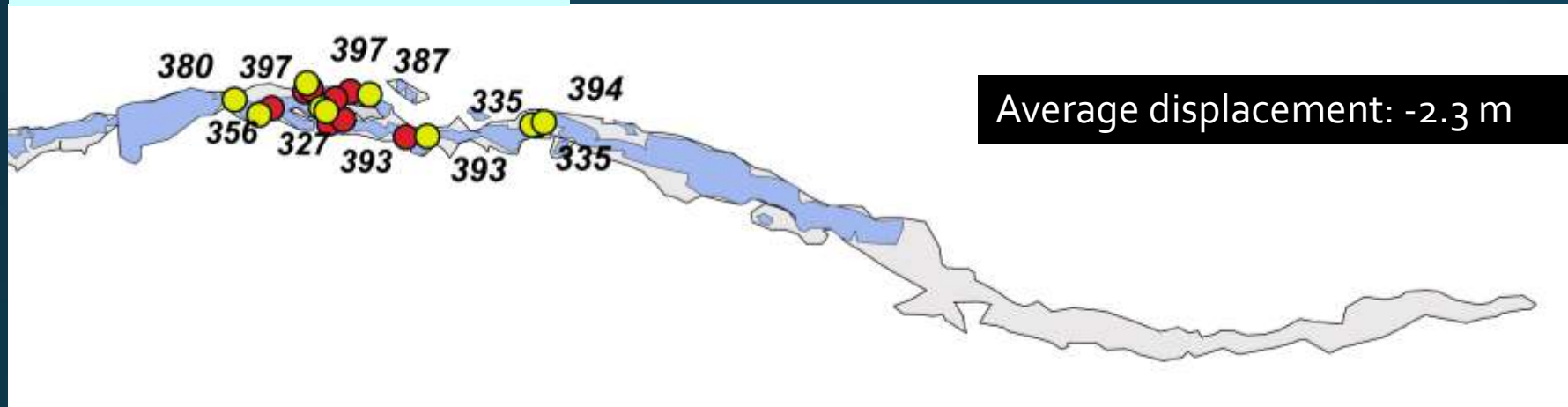
n = 8 fish  
Length;  $\bar{x} = 77$  mm,  $\sigma = 15$  mm

Groups were not  
statistically  
different in  
length

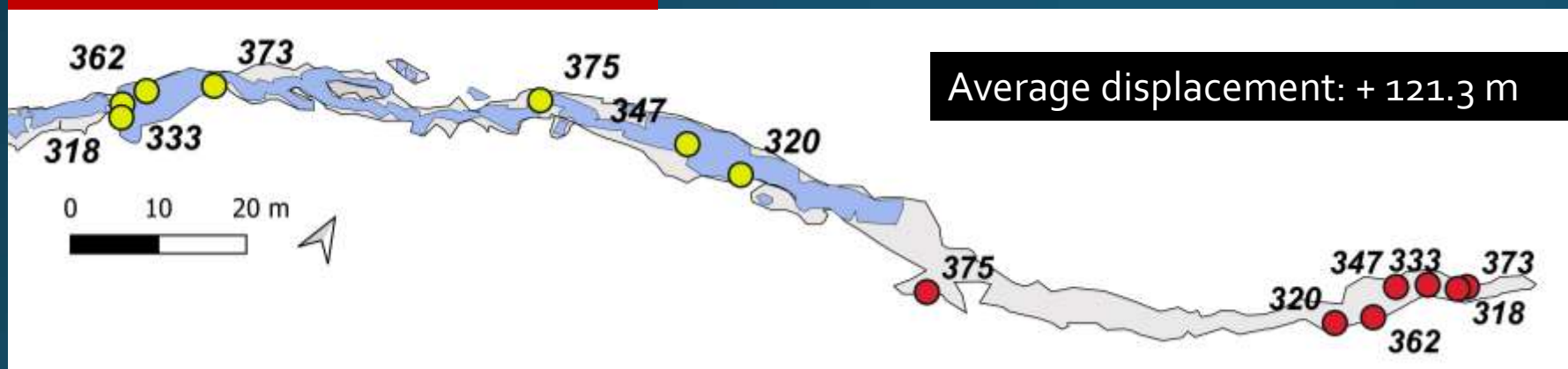
# Results

**Displacement:** positioning of fish prior to and following the cessation of the flow

Fish of Perennial stretch



Fish of Intermittent stretch



## Legend:

-  Last position before dry
-  First position after dry
-  Dried up areas
-  Permanently flooded areas

*One single fish did not survive the riverbed drying*

# Results

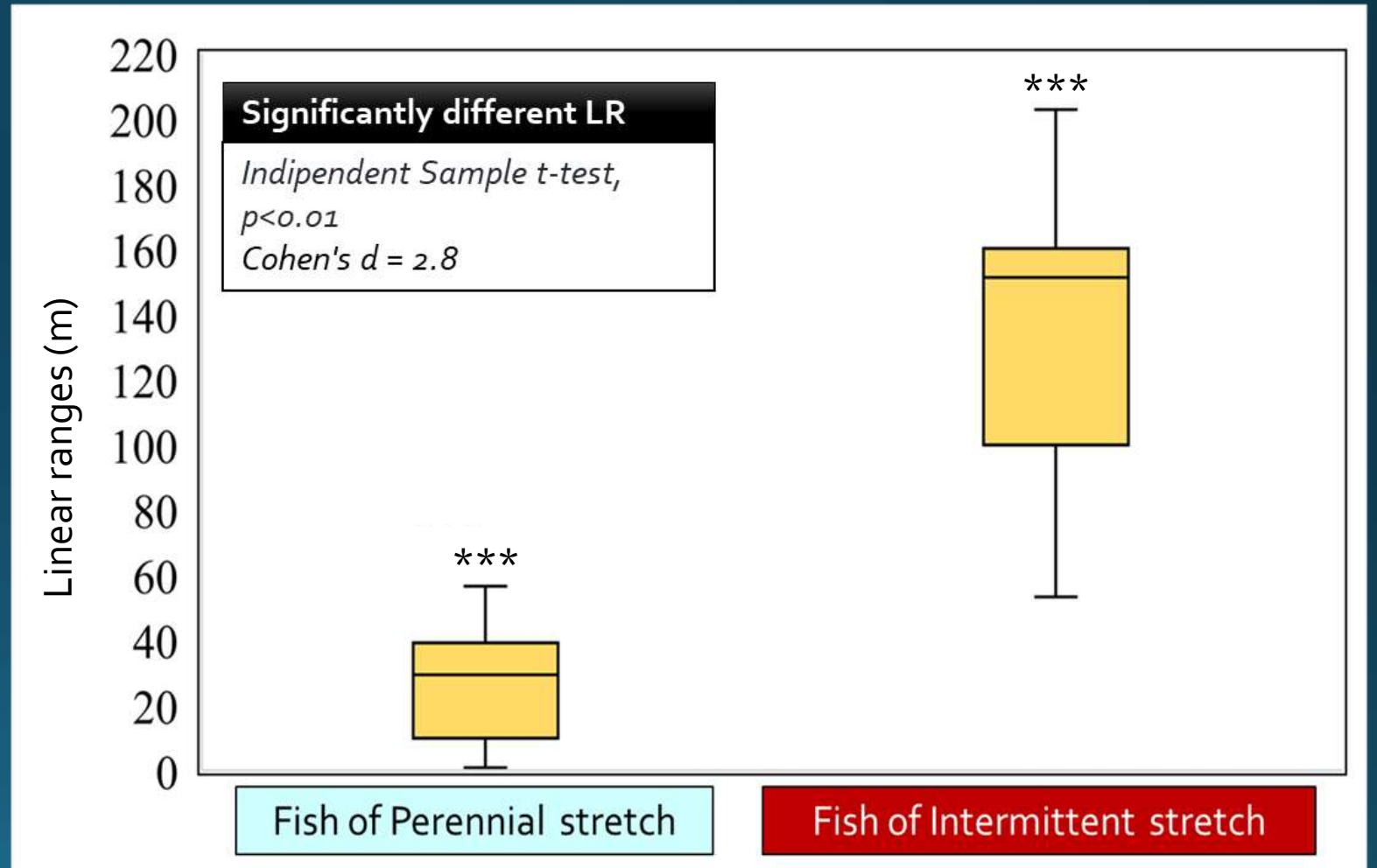
## Linear ranges (LR) comparison

### Perennial stretch (LR)

mean = 25 m (SE = 6.3 m)

### Intermittent stretch (LR)

mean = 132 m (SE = 18.9 m)



# Outcomes

Italian riffle dace exhibited small linear range and strong site fidelity (66% of Perennial stretch fish: LR < 35m)

Italian riffle dace migrated to aquatic refugia coping with the cessation of the flow

In the face of increasing water scarcity (Tramblay et al., 2020) and intermittent flows (Datry et al., 2014) longitudinal river connectivity is crucial.

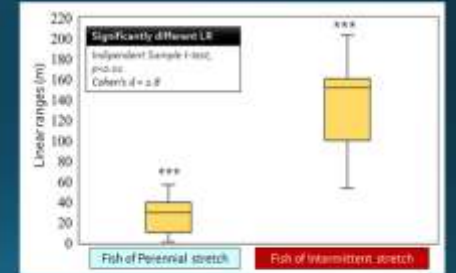
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# RIBES

Thank you for listening



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