

IAS ALONG THE DANUBE RIVER

EXPERIENCES OF THE JOINT DANUBE SURVEYS ORGANIZED BY THE ICPDR

Béla Csányi¹ and Momir Paunović², ICPDR Joint Danube Survey 5 IAS coordinators

¹Hydrobiologist, Budai Nagy Antal utca 14, Göd 2131, Hungary

²Institute for Biological Research „Siniša Stanković, University of Belgrade, Serbia

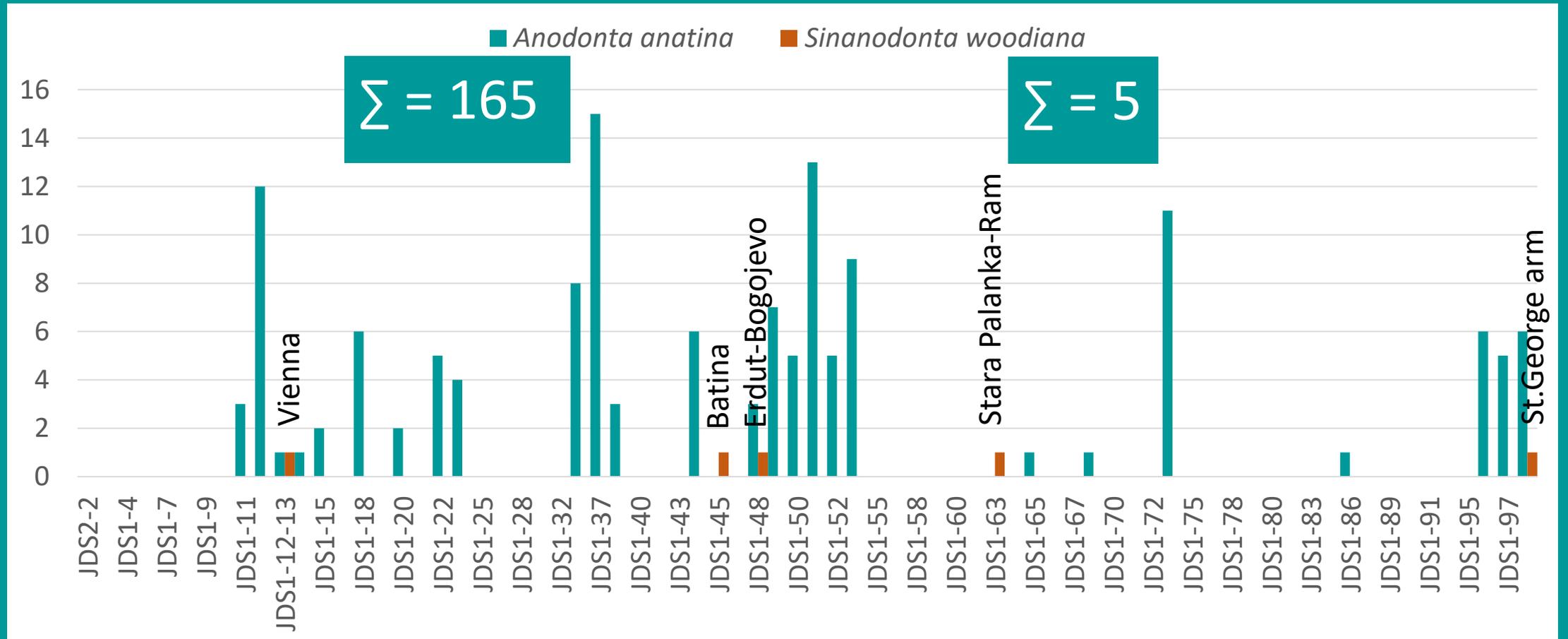


Main taxa

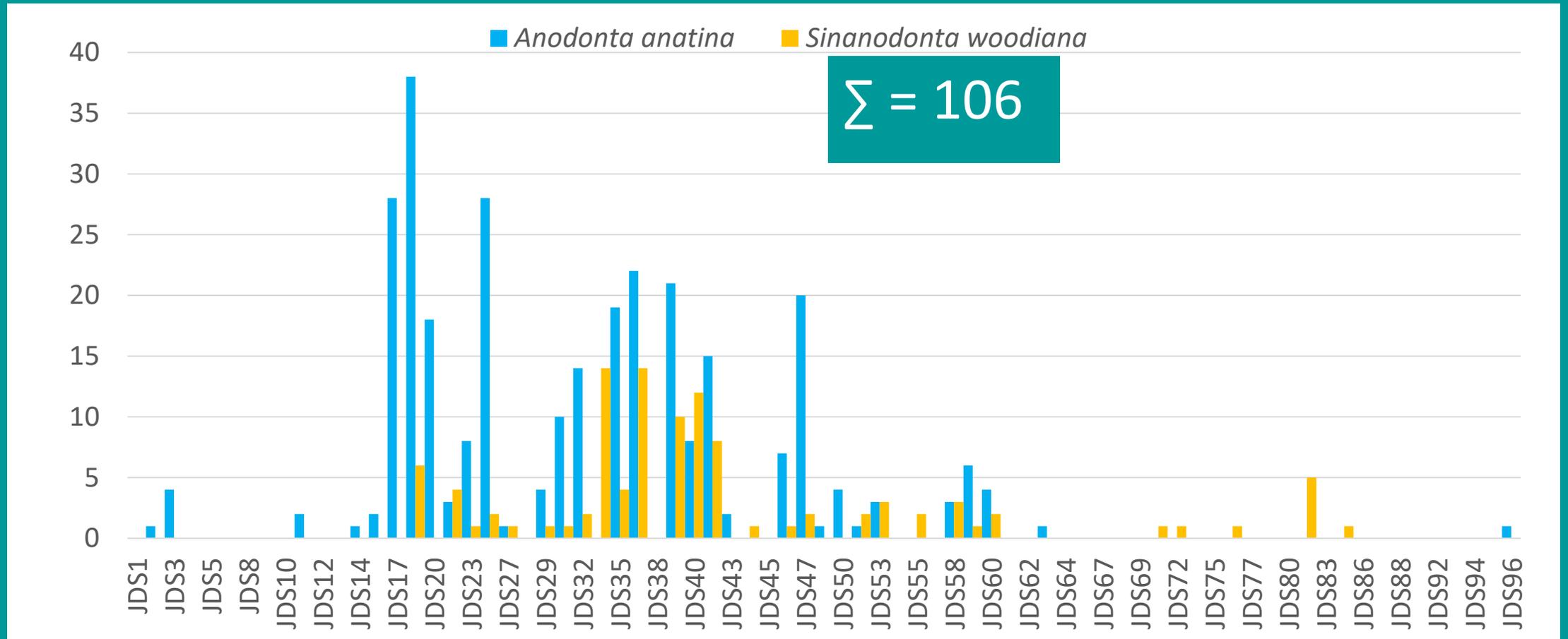
- *Sinanodonta woodiana* –
- *Corbicula fluminea* –
- *Dreissena polymorpha* & *D. rostriformis bugensis* –
- *Clathrocaspia knipowitschii* –
- Ponto-Caspian species
- Decapoda
- Reptiles – Aquatic Turtles



JDS1 – Longitudinal distribution of *Sinanodontia woodiana*

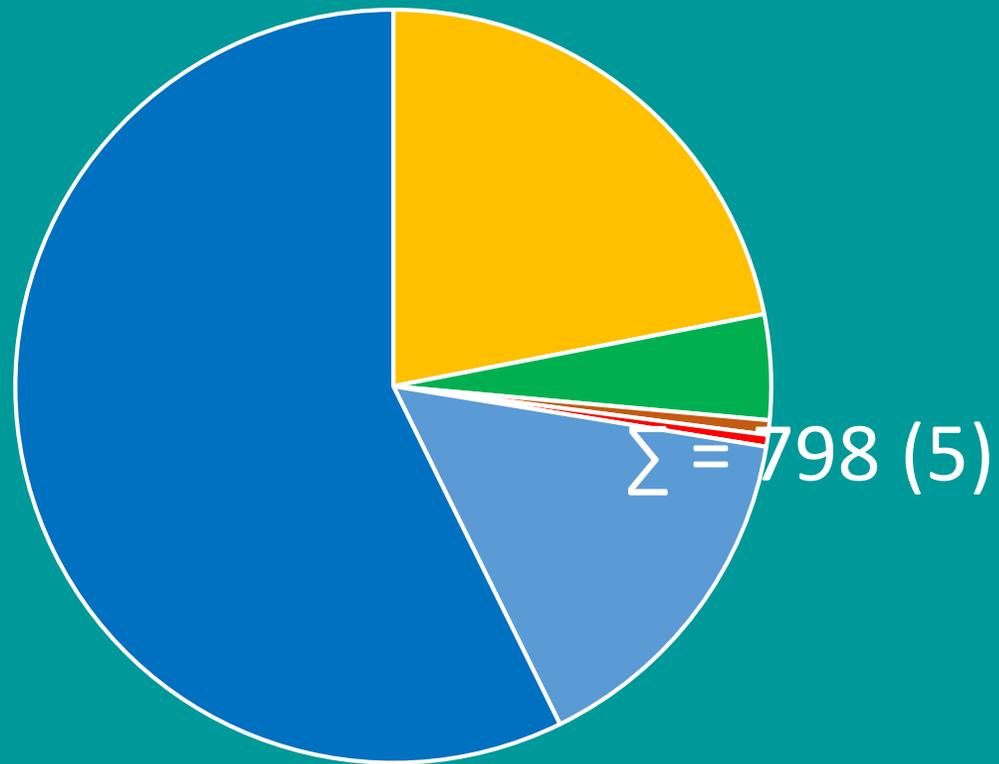


JDS2 – Longitudinal distribution of *Sinanodontia woodiana*



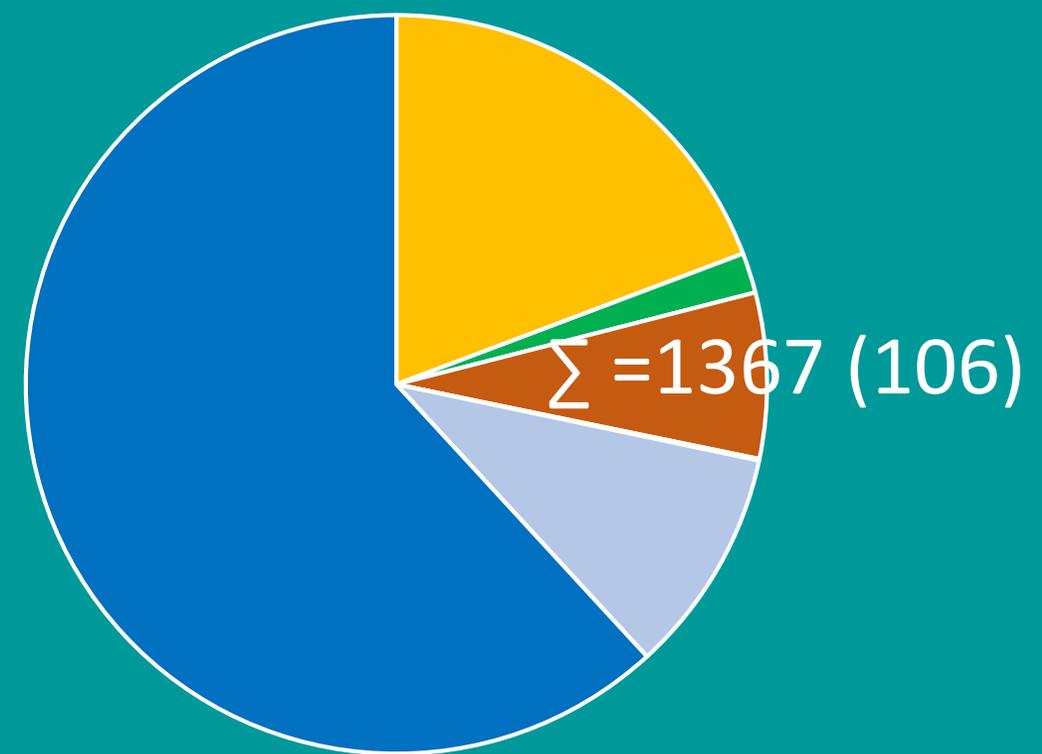
Relative abundance of Unionidae species in the Danube River

JDS1 - 2001



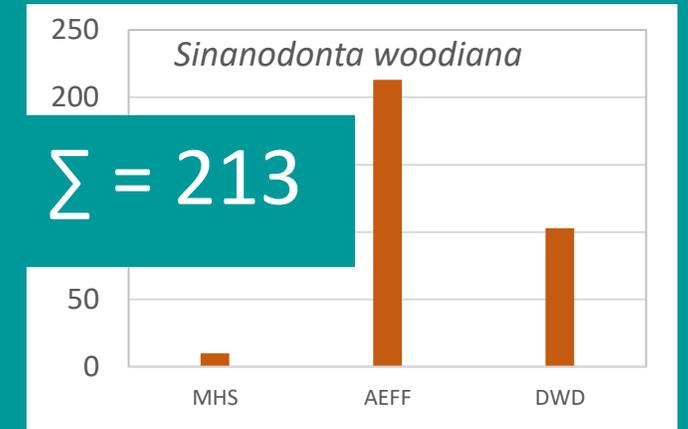
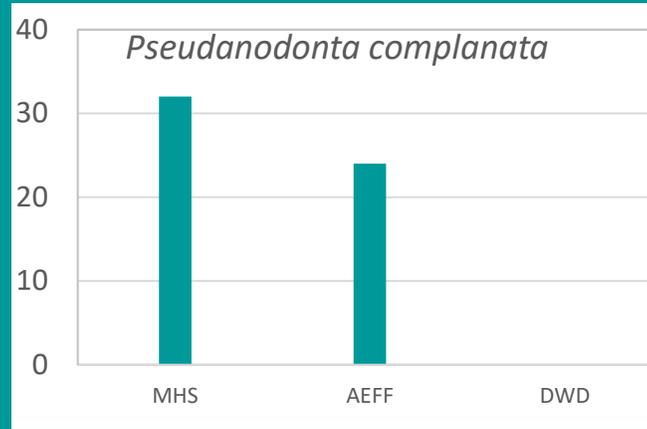
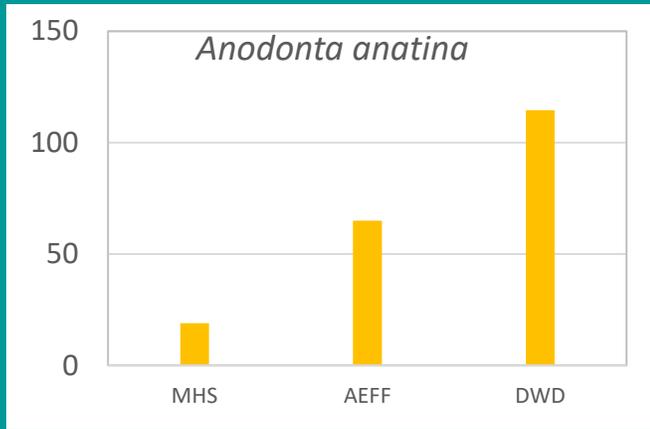
- Anodonta anatina*
- Sinanodonta woodiana*
- Unio pictorum*
- Pseudanodonta complanata*
- Unio crassus*
- Unio tumidus*

JDS2 - 2007

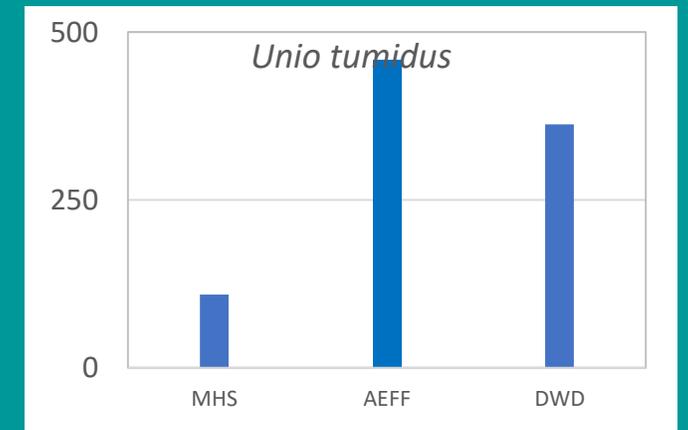
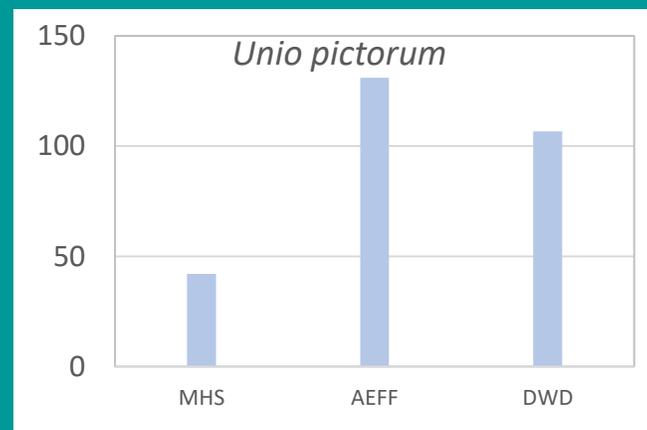
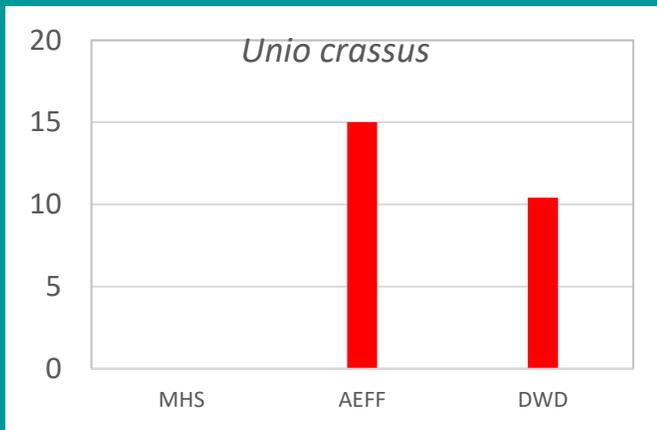


- Anodonta anatina*
- Sinaodonta woodiana*
- Unio pictorum*
- Pseudanodonta complanata*
- Unio crassus*
- Unio tumidus*

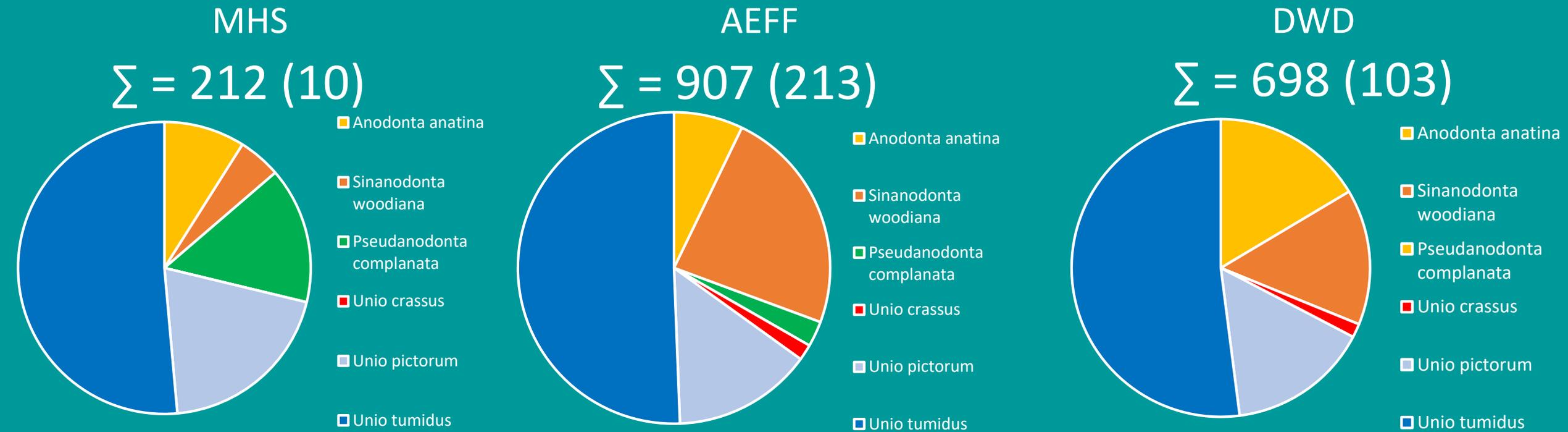
JDS3 – Mollusca – Bivalvia – Unionidae – Three methods



Sinanodonta woodiana is the second most abundant Unionidae sp.



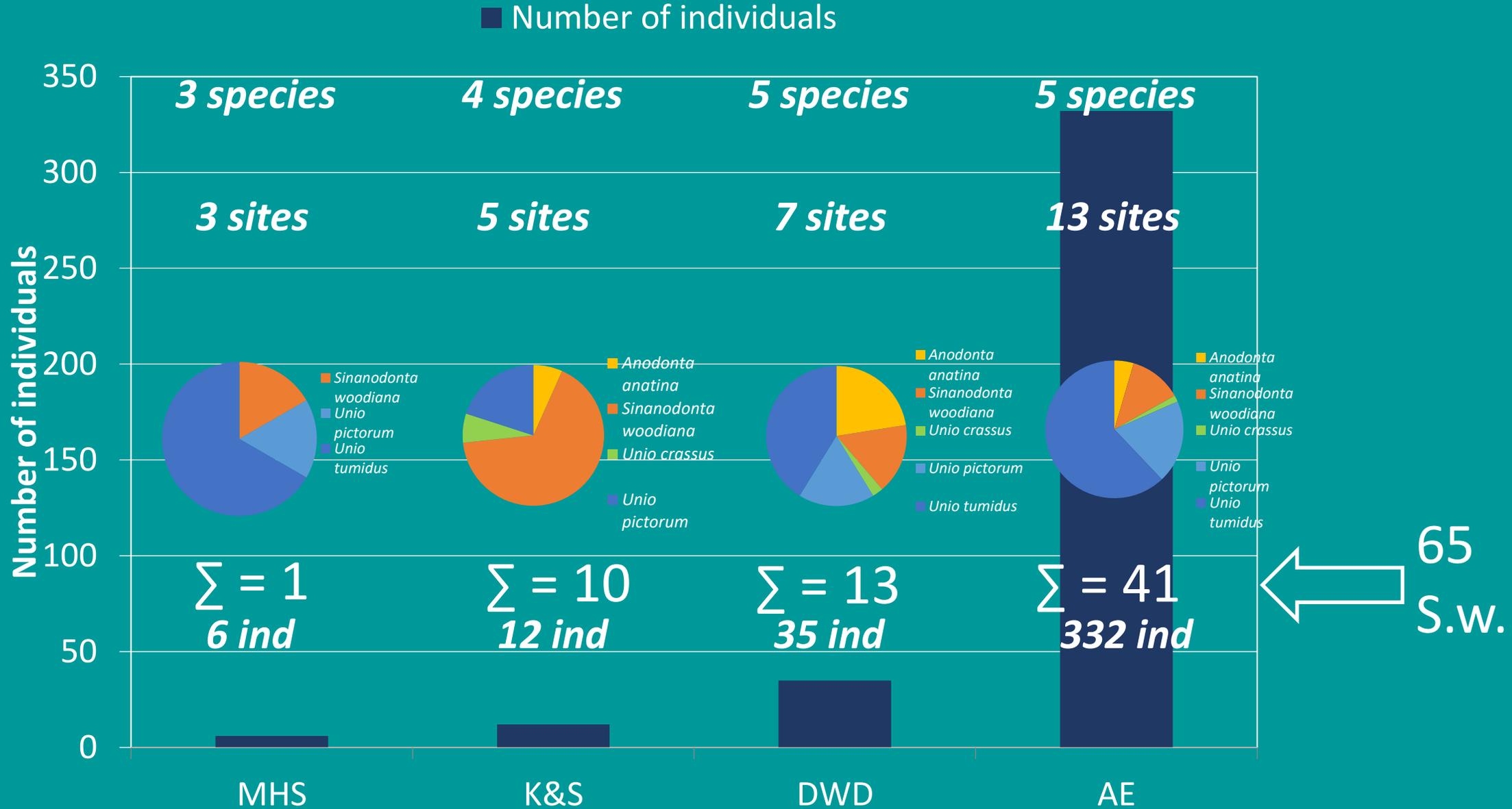
JDS3 – overall Unionidae composition of the Danube by three methods



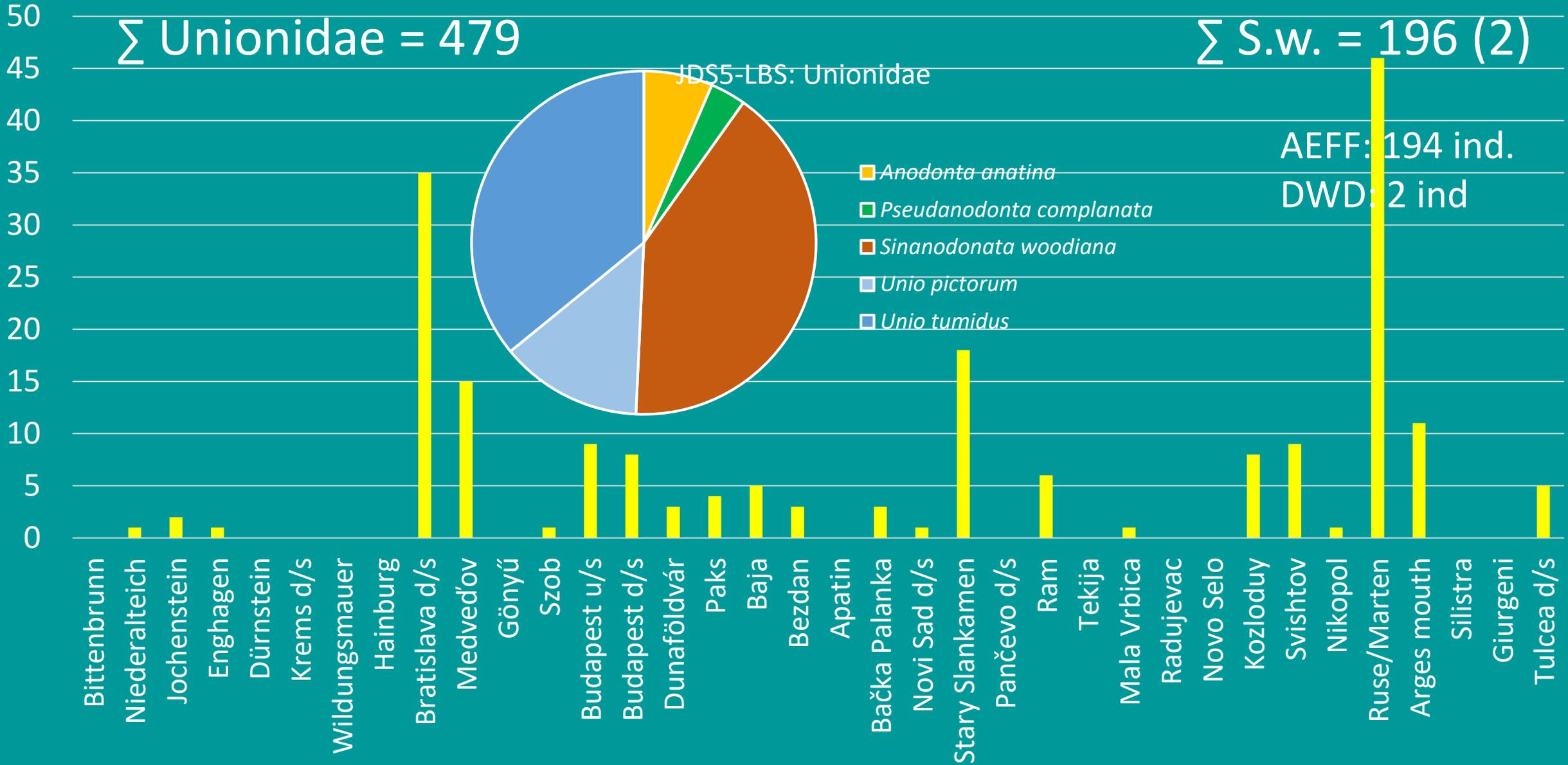
Problems with MHS: 1. Underestimated *Sinanodonta woodiana*; 2. Not detected *Unio crassus*; 3. Overestimated *Pseudanodonta complanata* (probably bad identification of *Anodonta anatina*)

MHS is good for the detection of the two most common species

JDS4 - 942 km long Danube (HU-RS) - 17 sites

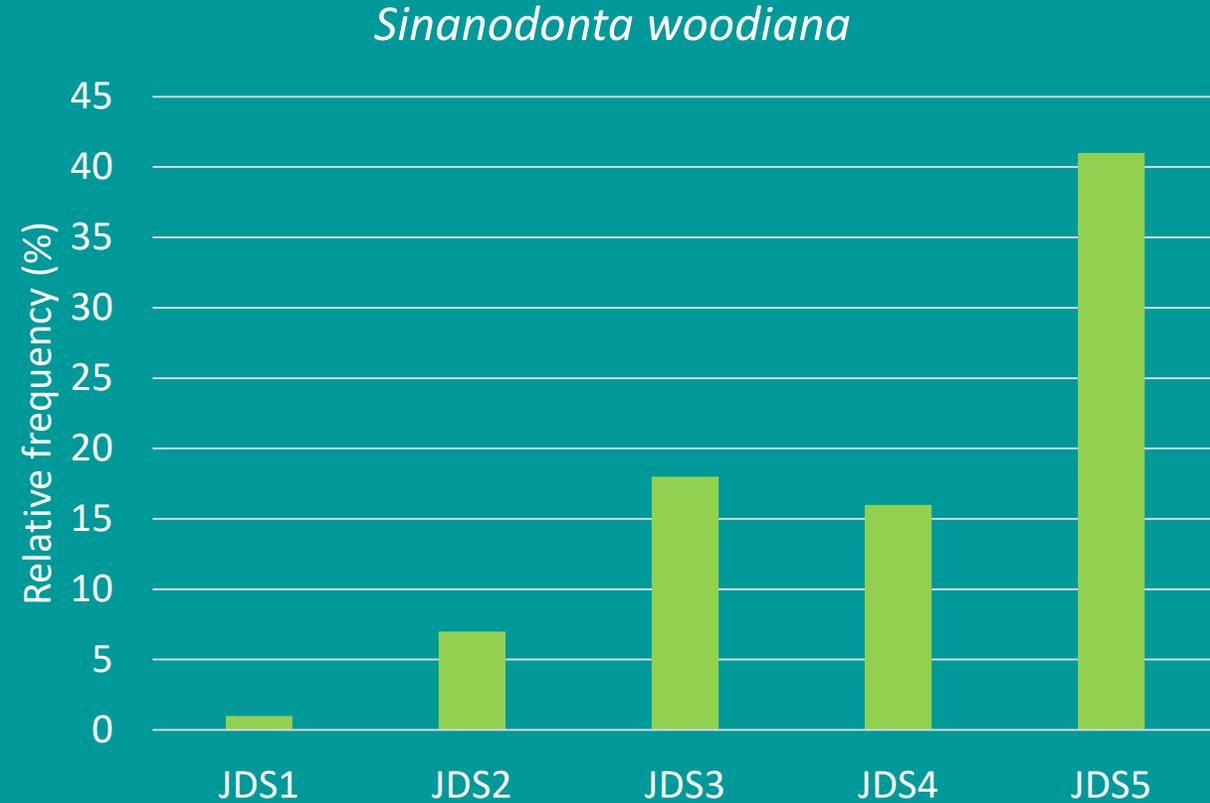
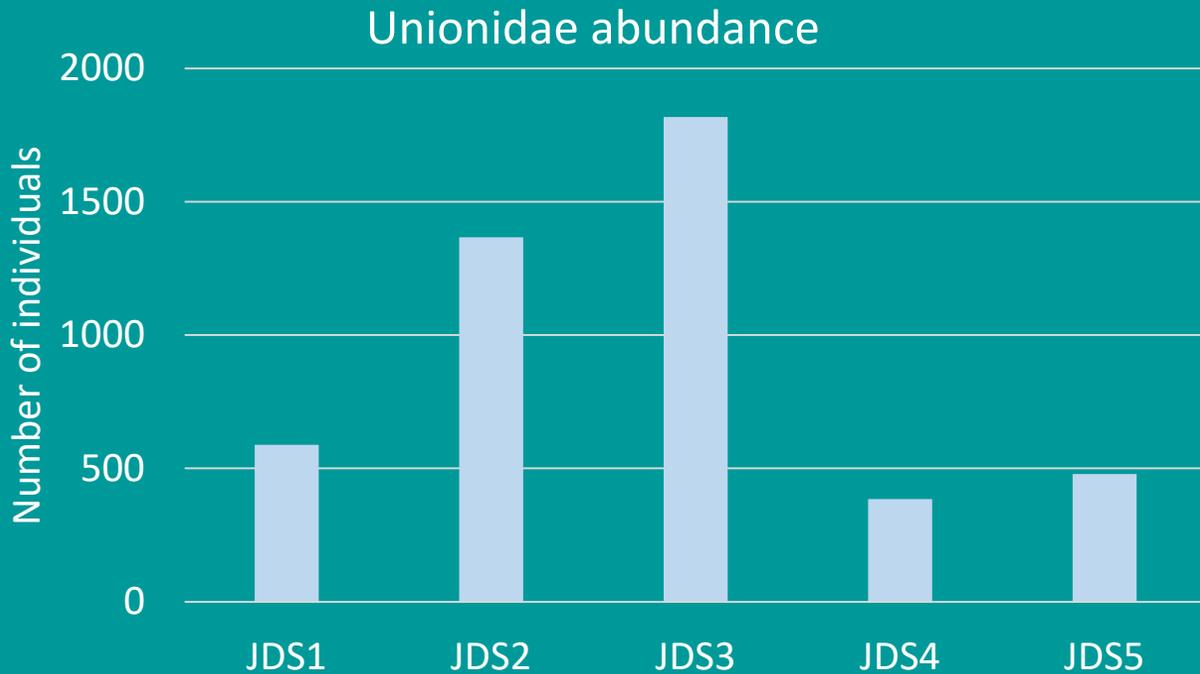


JDS5 – LBS – *Sinanodonta woodiana*, two methods



Change of relative frequency

- JDS1 1 %
- JDS2 7 %
- JDS3 23 %
- JDS4 12 %
- JDS5 – LBS 41 %





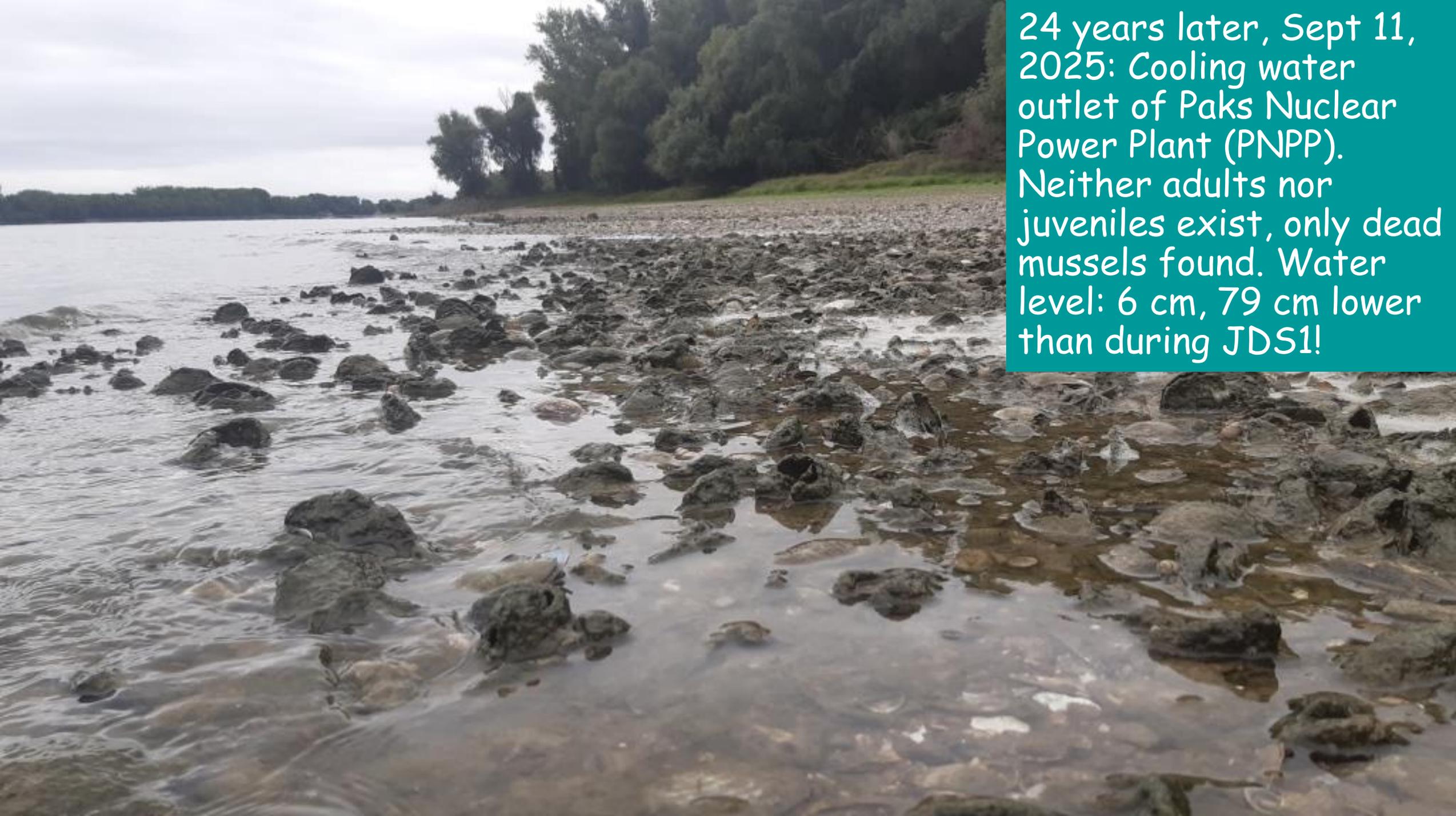
Cooling water outlet of Paks Nuclear Power Plant (PNPP), August 29, 2001, JDS1, water level is 85 cm on the Paks gauge

Live mussels and mass of shells next to the cooling water outlet of Paks Nuclear Power Plant (PNPP). JDS1, August 29, 2001, Water level: 85 cm on the Paks gauge



Live mussel and snail population,
PNPP, JDS1, August 29, 2001,
water level is 85 cm





24 years later, Sept 11, 2025: Cooling water outlet of Paks Nuclear Power Plant (PNPP). Neither adults nor juveniles exist, only dead mussels found. Water level: 6 cm, 79 cm lower than during JDS1!

Dead mussel shells directly below the
cooling water outlet, PNPP,
September 11, 2025.
NO LIVE MOLLUSKS WERE FOUND.





Strange shell
malformation
of a
*Sinanodonta
woodiana*
collected at
PNPP just
below the
cooling water
outlet on
September
11, 2025.

Malformation
of a
Sinanodonta
woodiana
is
enlarged



Budapest, d/s
(1630 rkm)



Approx. 4 years old
Sinanodonta woodiana:
terrible malformation of
the shell



Danube, Sződliget, 29 Aug. 2025



$\Sigma = 111 (1)$



JDS5 Dunakeszi,
u/s Budapest
22 July 2025



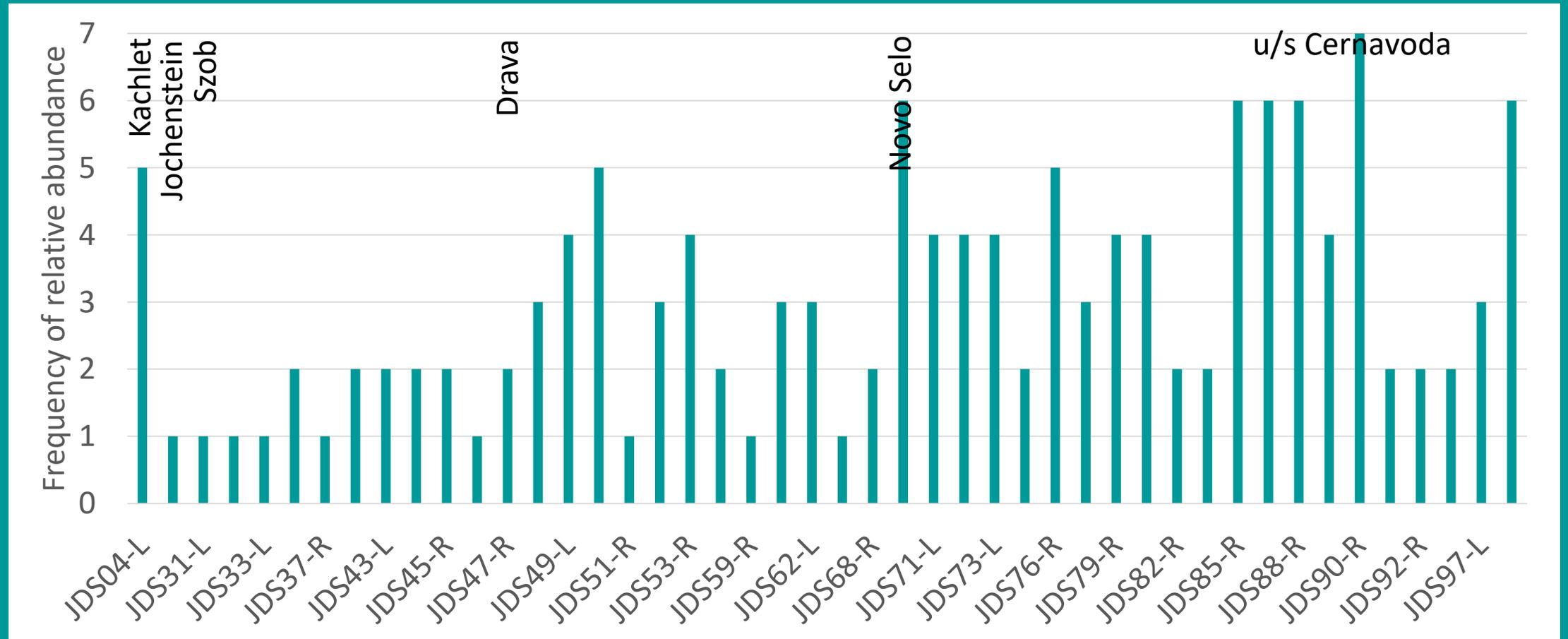
JDS2 - Mass of *Corbicula fluminea* d/s Jantra,
Romanian (left) Danube side



Corbicula fluminea & native
Hollandriana holandrii

Successful coexistence

JDS1 - Abundance of *Corbicula fluminea* (Rel. Abundance on interval scale 1-7)



Uppermost section on the Hungarian – Slovakian Danube: Esztergom, right

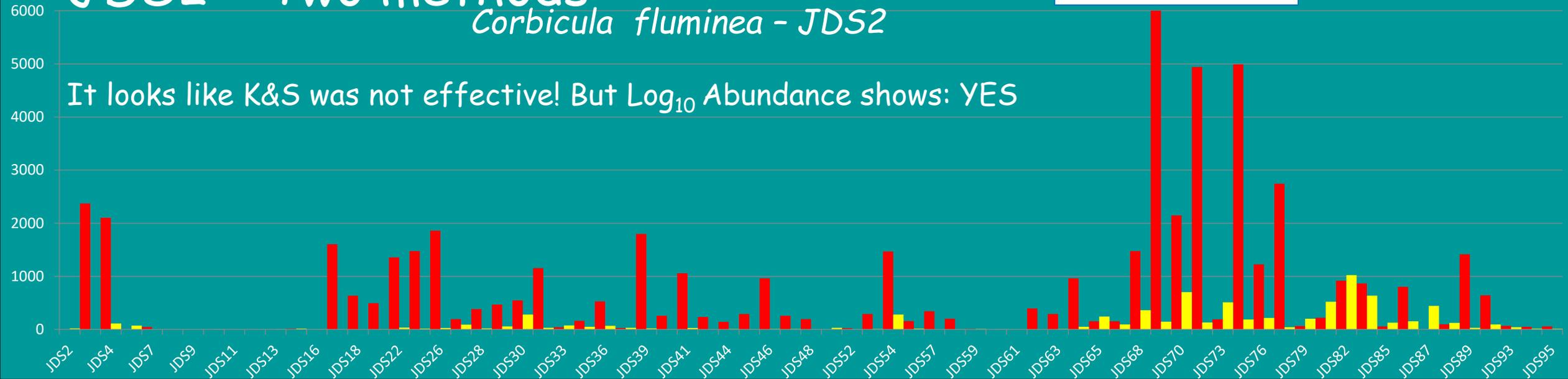
JDS2 - Two methods

Air Lift K&S/Dredge

9896/JDS69

Corbicula fluminea - JDS2

It looks like K&S was not effective! But \log_{10} Abundance shows: YES

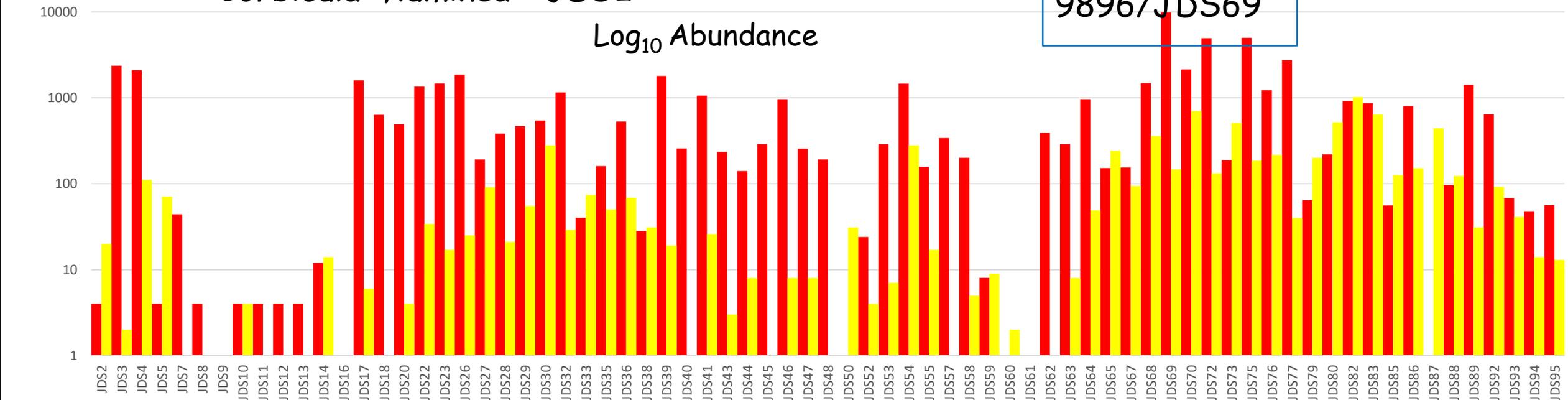


Corbicula fluminea - JDS2

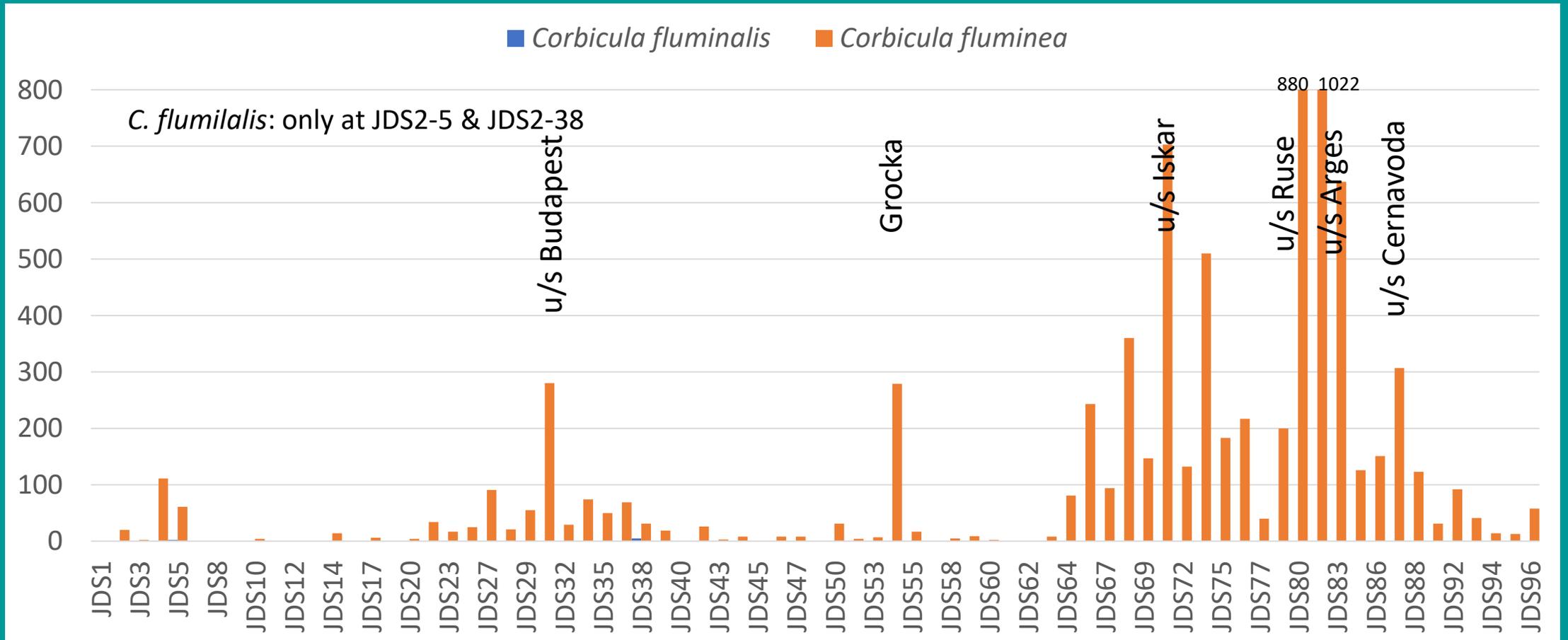
Air Lift K&S/Dredge

9896/JDS69

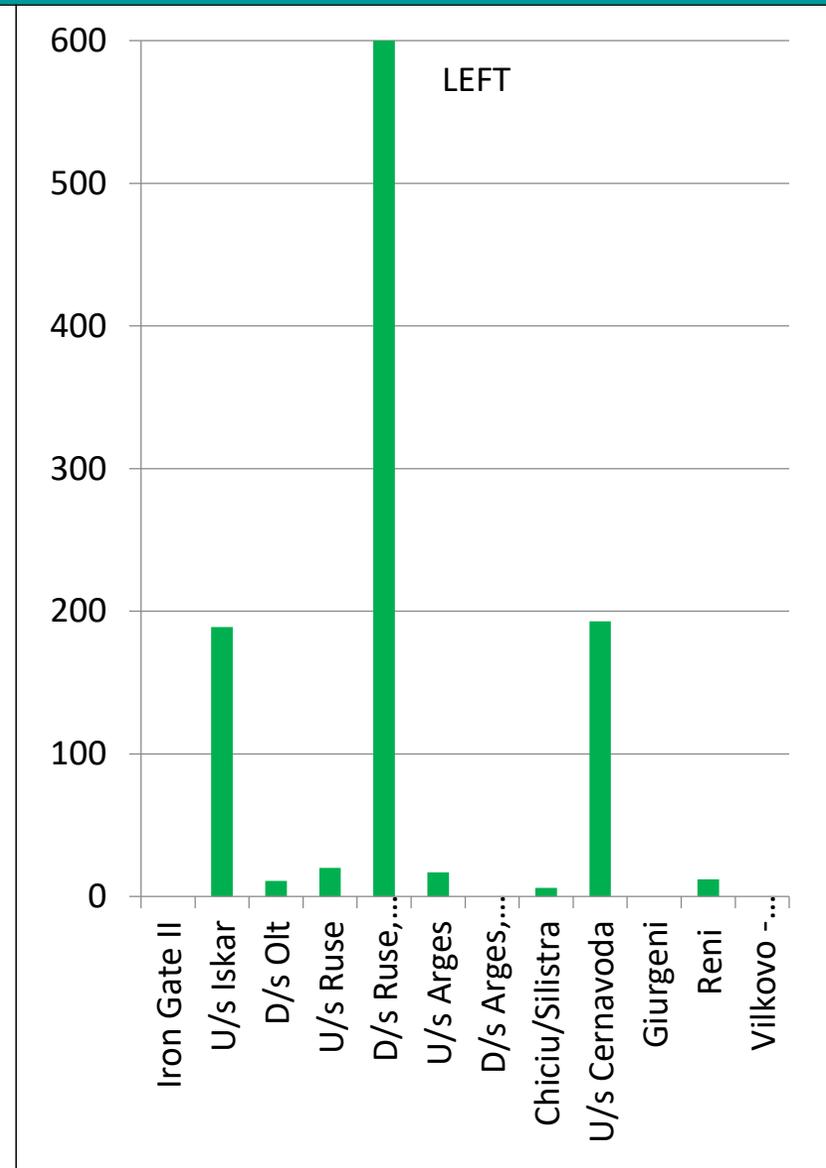
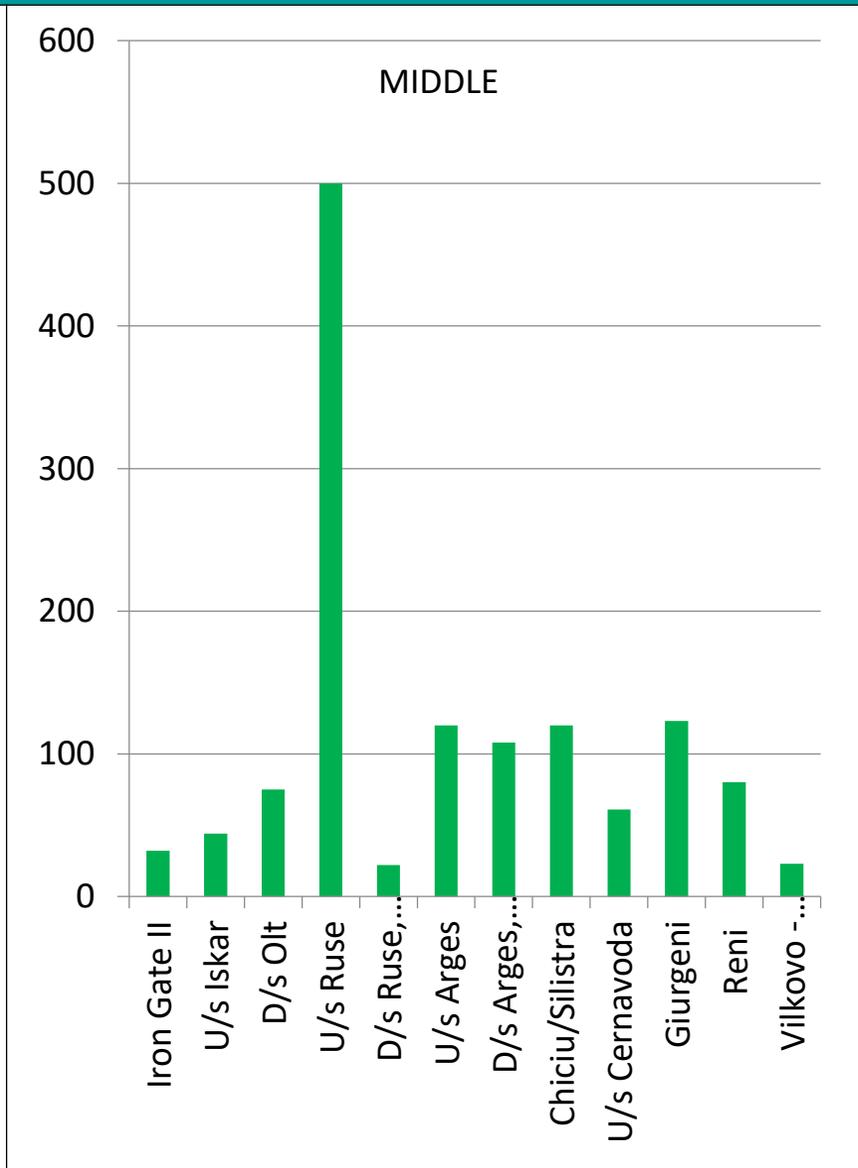
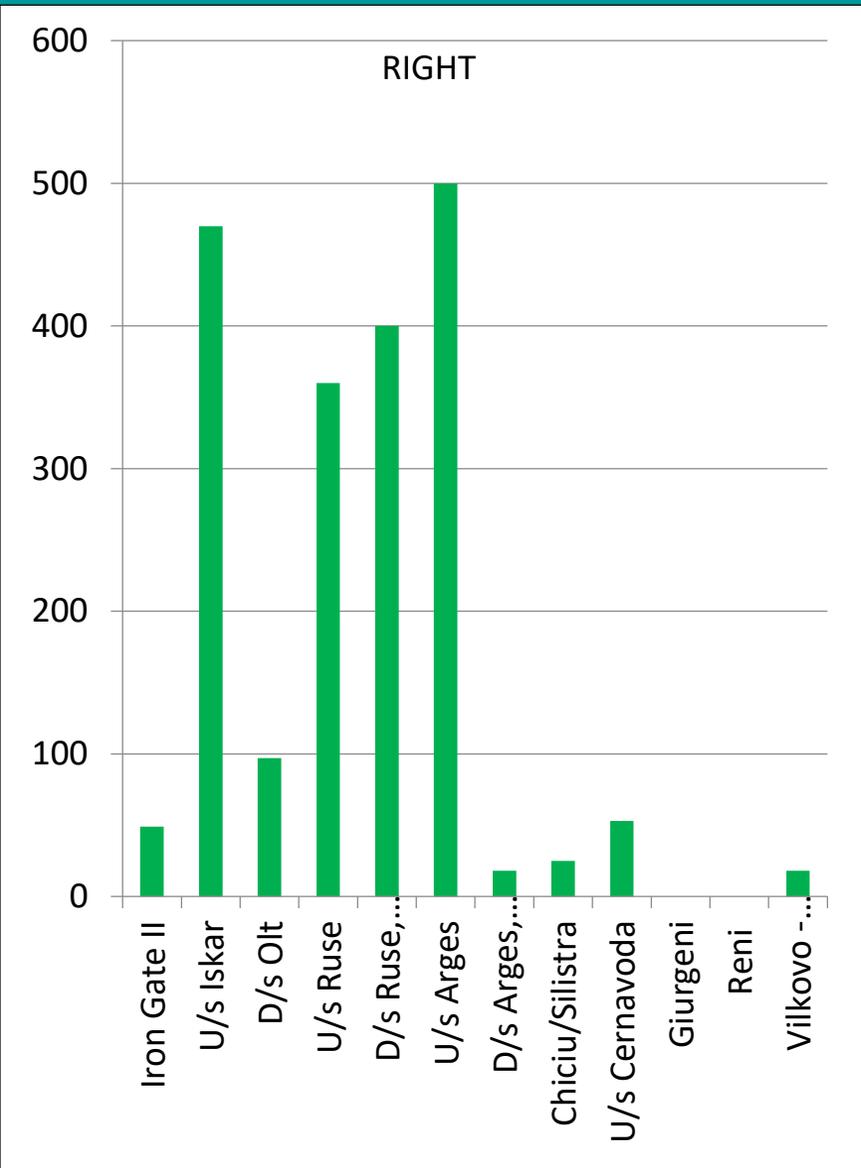
\log_{10} Abundance



JDS2 – Longitudinal distribution of taxa K&S (JDS1-JDS63); Dredgeing (d/s JDS63)

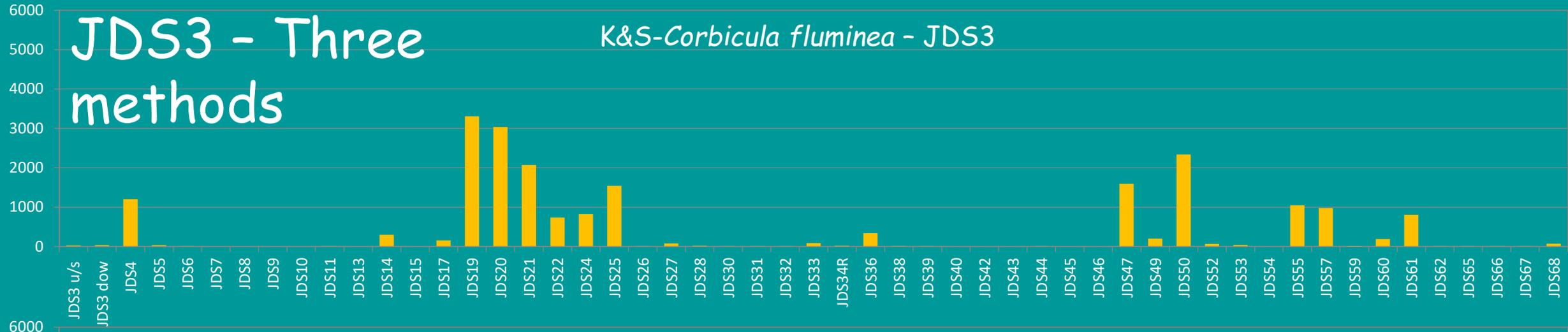


JDS2 – Longitudinal & transversal distribution of *Corbicula fluminea* on the Lower Danube-1

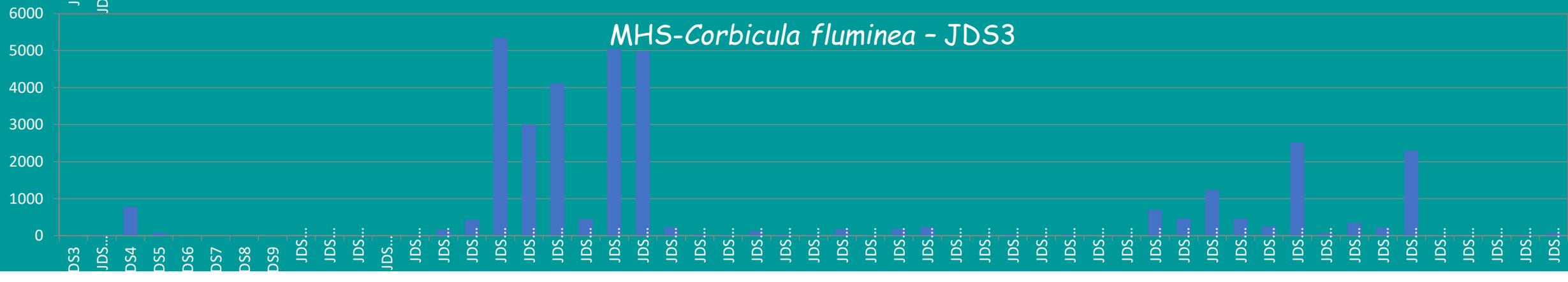


JDS3 - Three methods

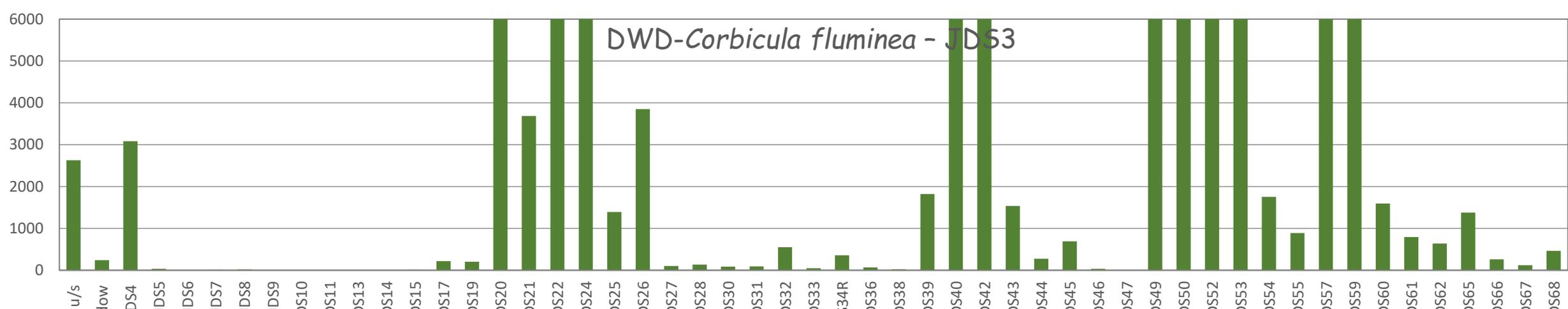
K&S-Corbicula fluminea - JDS3



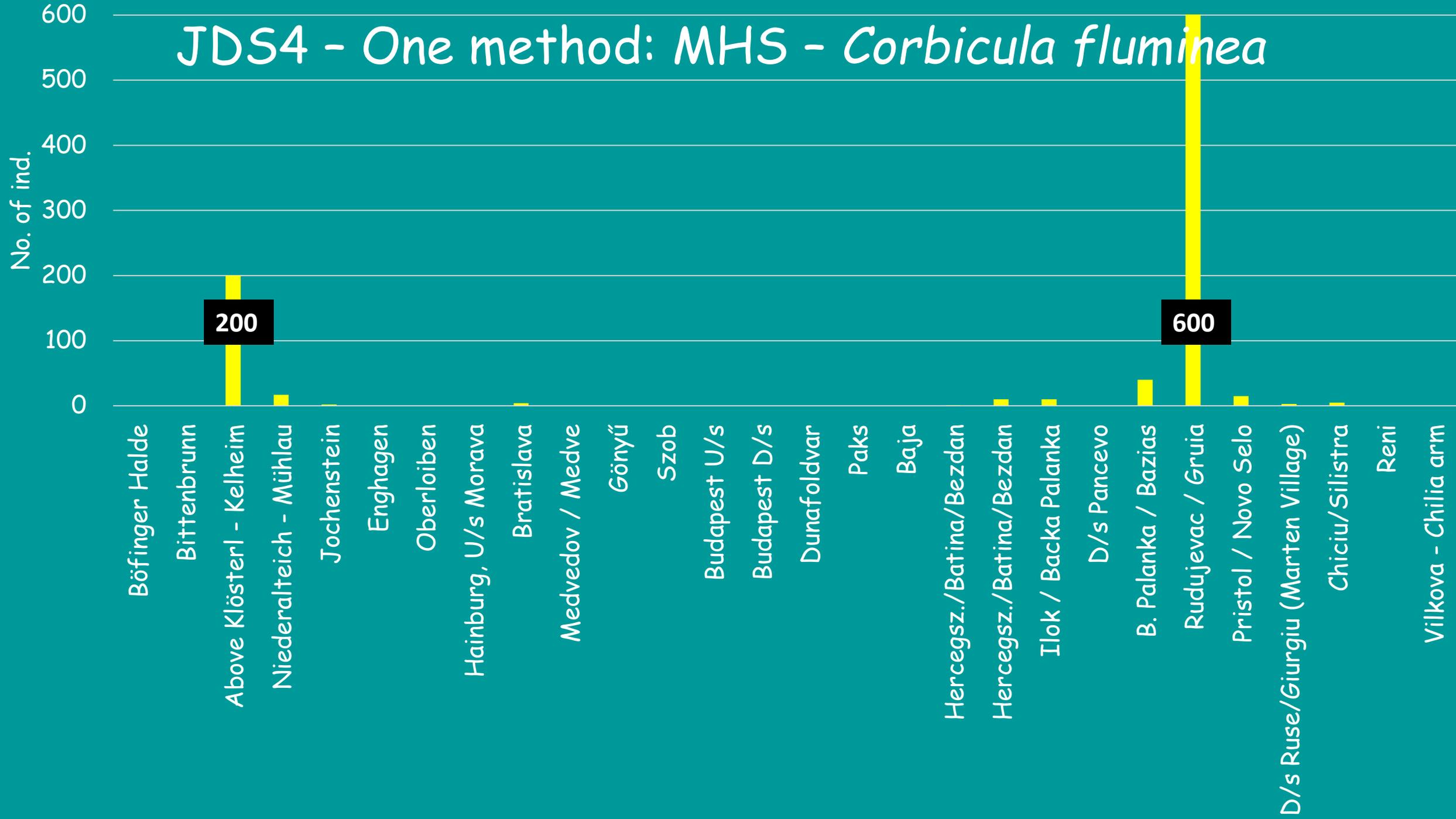
MHS-Corbicula fluminea - JDS3



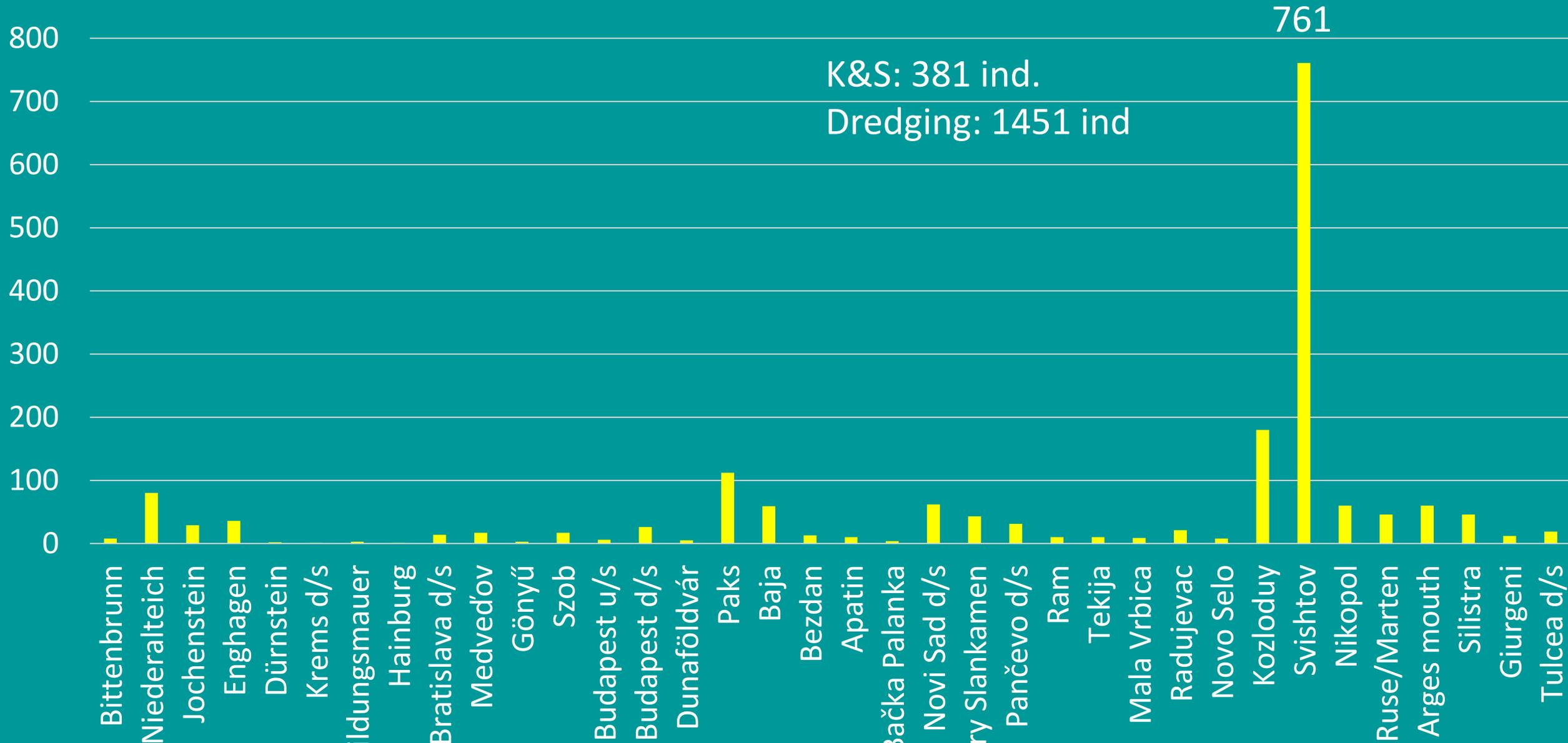
DWD-Corbicula fluminea - JDS3



JDS4 - One method: MHS - *Corbicula fluminea*



JDS5 – LBS - *Corbicula fluminea*, two methods



ARGUS
BEOGRAD

Mussel
collection

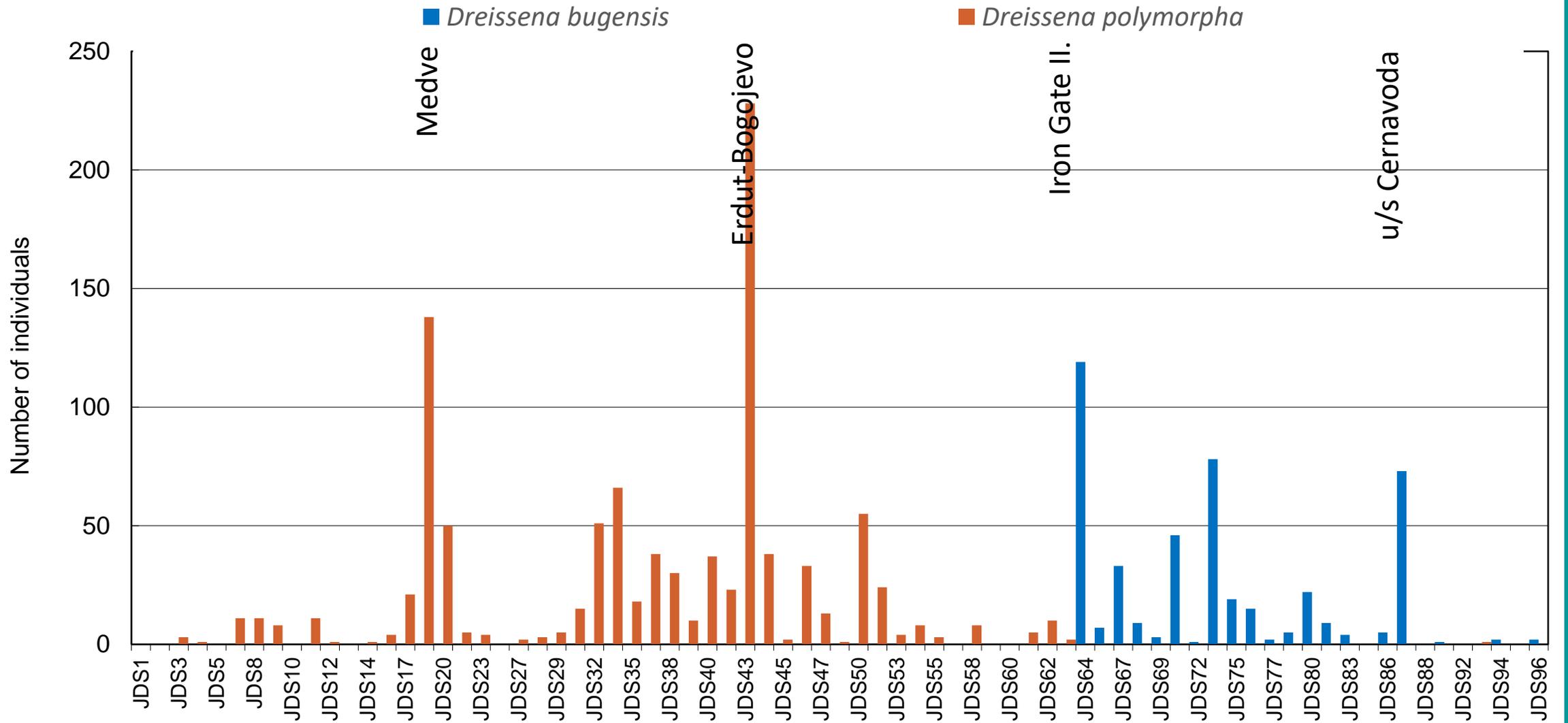




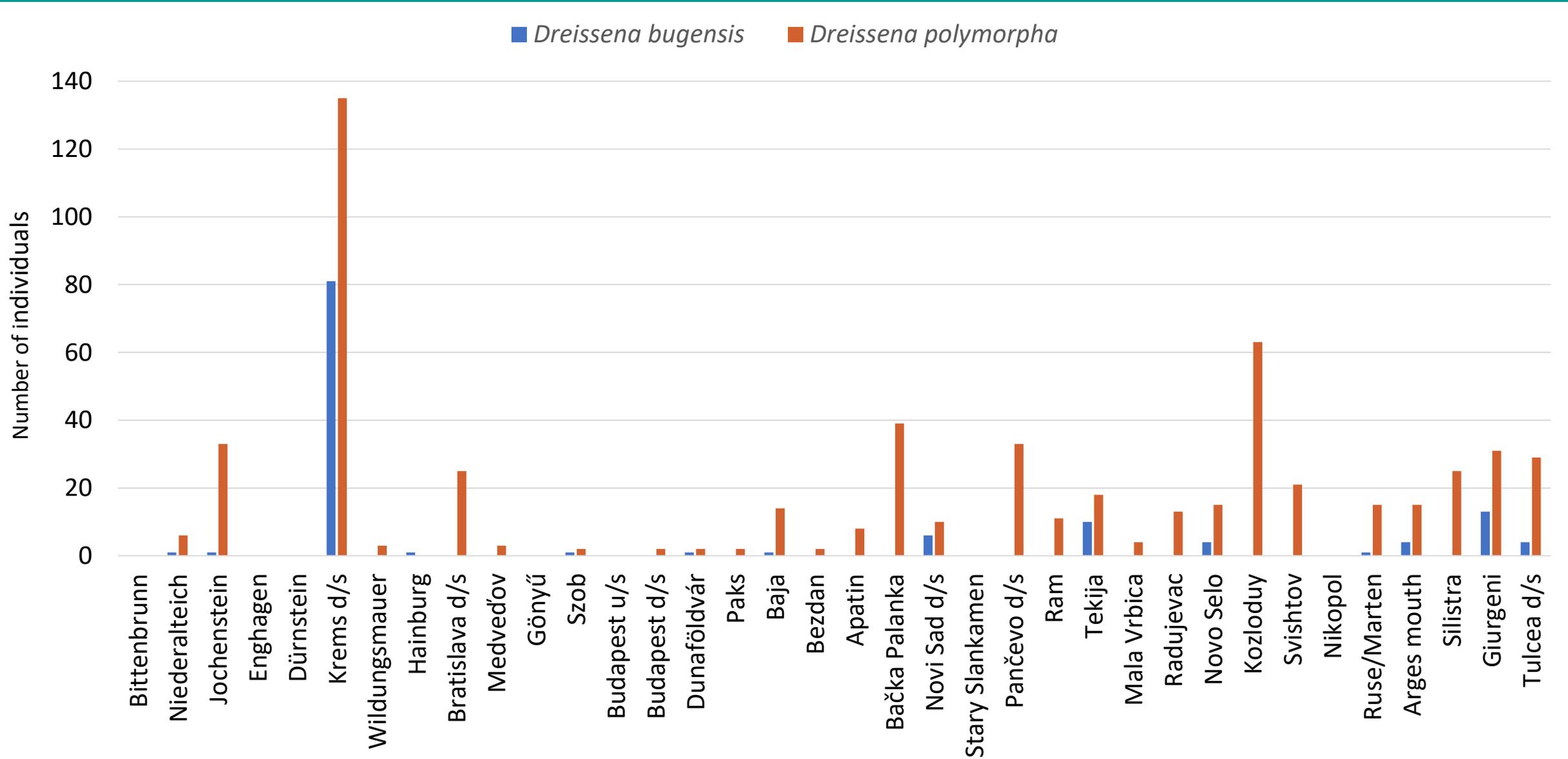
Massive colony of *Dreissena polymorpha* along the Croatian section during JDS1



JDS2 – Longitudinal distribution of taxa



JDS5 – LBS - Longitudinal distribution of taxa



Danube-Black Sea Canal – as advised by my friend, Marius Skolka
Ship-traffic up- and downstream was intensive and permanent.





The first short dredging resulted in a catch of a small colony.

But it became evident that both *Dreissena* species are living here. Just the way of catching them should have been clarified:

A 50 m long dredging along the wall was needed!



The biomass of the two species is more than enough!
We move on, the air temperature is 34 C°



Method 1: box-like dredge





Method 2: cage-like dredge. Both of them are pulled backwards with the motorboat engine. A lot of mussels and wooden debris were collected. Few Dreissena are present. But - slowly by slowly - enough sample was collected!





The sample contains several living mussels and dead shells, either on them could be (rarely) Dreissena-colonies.

*Two good samples were taken.
So, let's start to go home now!!*

RSD - Tass: still raining but great success here: both species are present in large amount



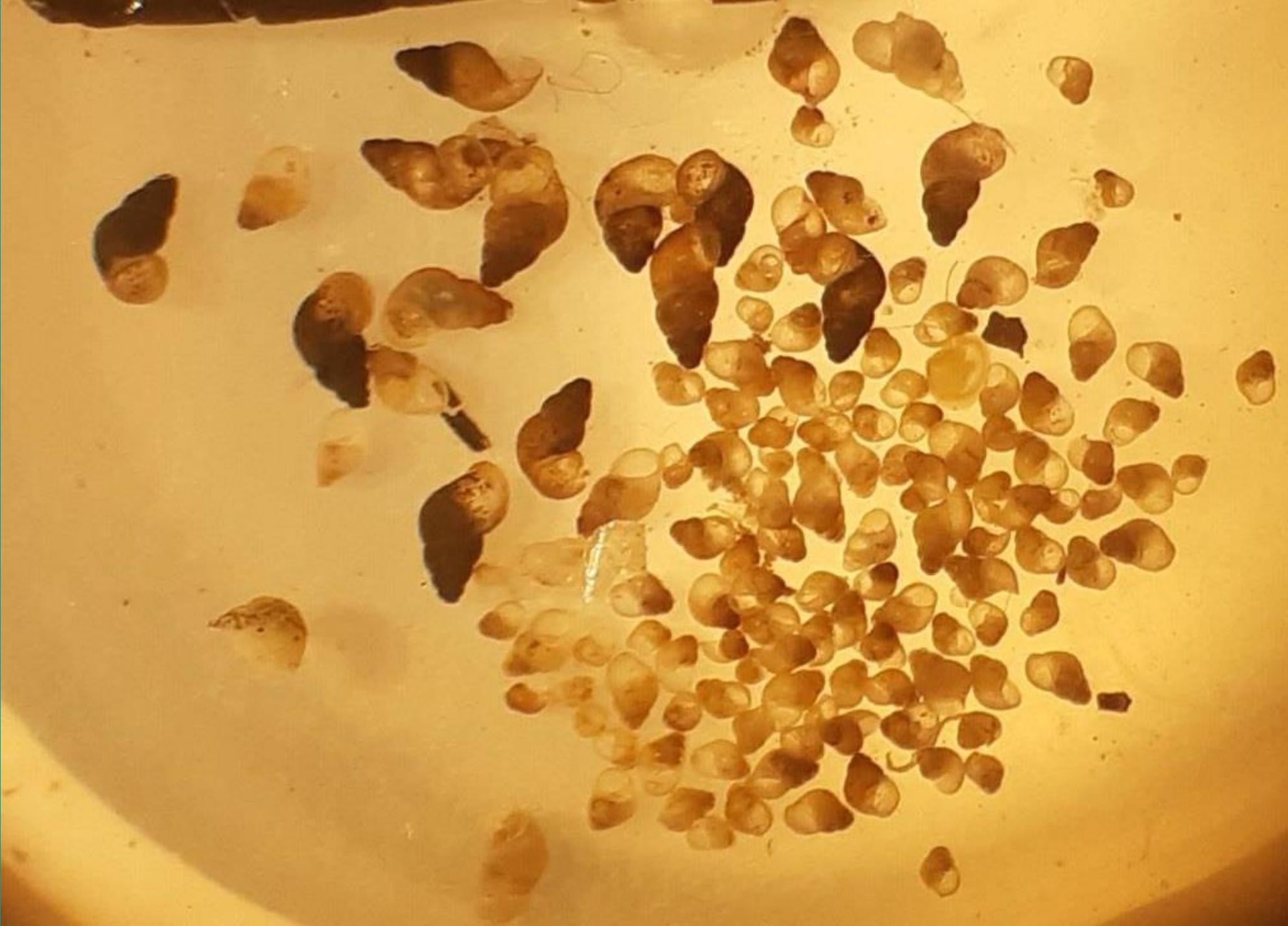
Habitat



Clathrocaspia knipowitschii

New snail species in the Danube
During JDS3 large individual numbers were detected d/s Iron Gate I in the cross section.
We detected the species here in 2018 again.
We detected it on the Hungarian Danube in 2019. Its habitat: gravel bed!





The *Clathrocaspia knipowitschii* snail can now be found in many places between Medve and Dunakeszi. The photo shows numerous (~100) juveniles and a few (13) adults, which we collected in the Gönyű section in July 2021.

Pectinatella magnifica



Decapoda

Same methodology applied during JDS4 & JDS5 - Three Methods

- Electrofishing, crayfish trapping & hand searching – András Weiperth & his PhD team
- *Macrobrachium nipponense* on the Hungarian main Danube arm – Esztergom
- *Faxonius limosus* – Along the whole Danube
- *Pacifastacus leniusculus* – Austrian & Upper Hungarian Danube, Szigetköz, Szob, u/s Novi Sad
- *Procambarus clarkii* – Komarno (SK) - Baja
- *Eriocheir chinensis* – Mohács

Common in the Danube



Faxonius limosus

Spread in the Upper Danube, Szigetköz



Pacifastacus leniusculus



Procambarus clarkii & *Procambarus virginialis*

Komárom - Baja



Small creeks running to the Danube



Chinese mittencrab (*Eriocheir sinensis*)



Cherax quadricarinatus



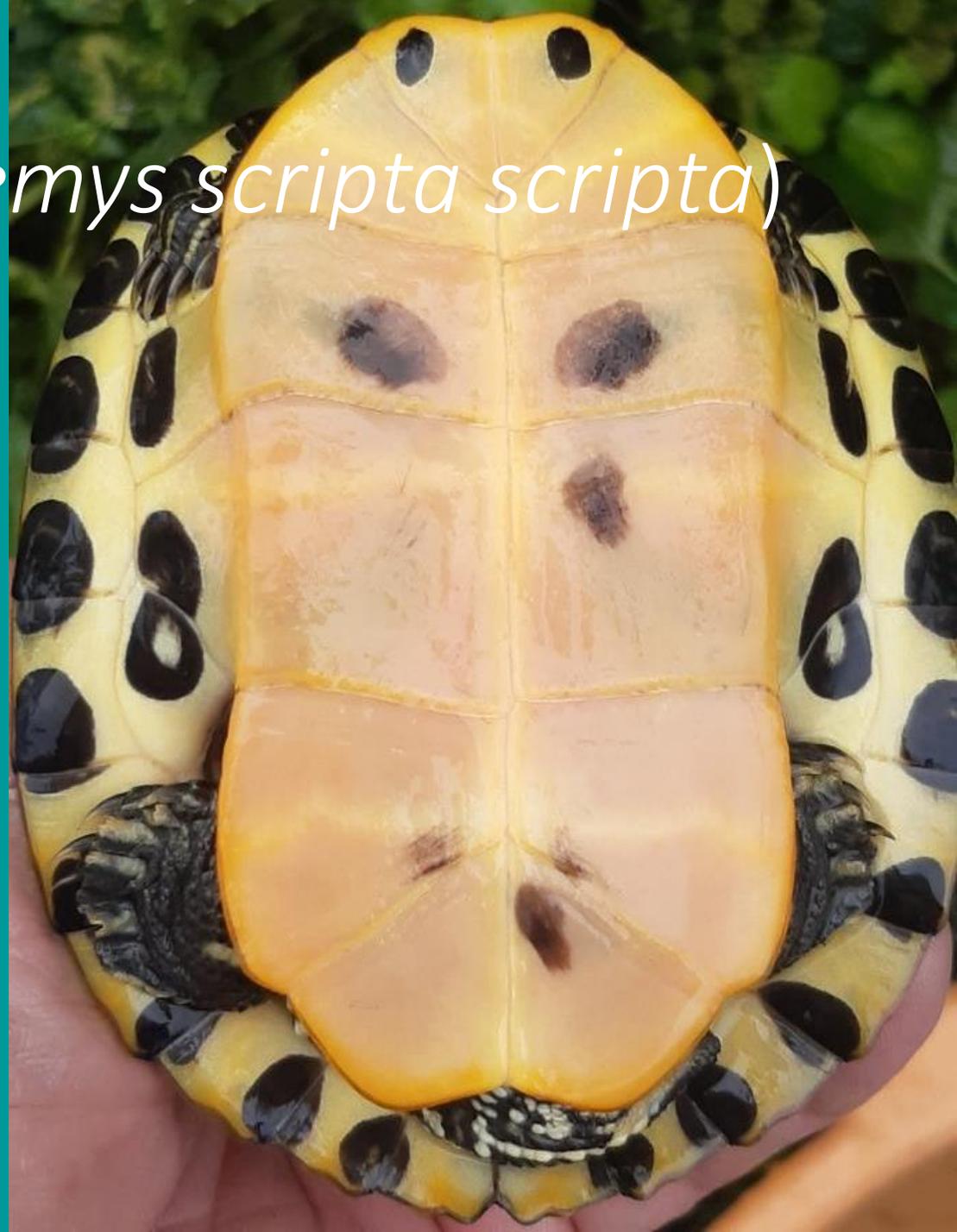
Macrobrachium nipponense adult & juvenile (left, middle); brackish-water shrimp (right)



Red eared slider (*Trachemys scripta elegans*)



Yellow eared slider (*Trachemys scripta scripta*)





Graptemys pseudographica

*Graptemys
pseudographica*





Graptemys pseudographica



Chinese
softshelled
turtle
(*Pelodiscus
sinensis*)



Chinese stripe-necked turtle (*Ocadia sinensis*)

Chinese stripe-necked turtle (*Ocadia sinensis*)





Chinese pondturtle (*Mauremys reevesii*)

Stinkpot (*Sternotherus odoratus*)

