



# BRODOLOM IZ 1. ST. PR. KR. KOD RTA LETAVICE NA OTOKU PAGU



## Shipwreck from the 1<sup>st</sup> century BC near Cape Letavica on the island of Pag

IN SITU - 3/1 (2024)

**T**ijekom dosadašnjih istraživanja odlično očuvanog nalazišta kod rta Letavice na otoku Pagu, koja s kraćim prekidima traju od 2018. godine, otkrivena je velika količina čepova amfora te oko stotinu keramičkih i metalnih predmeta. Osim dviju olovnih prečki antičkih sidara i pretpostavljenog valosjeka, otkrivenih s istočne strane nalazišta, većina predmeta otkrivena je s njegove južne strane, duž koje se i dalje pronalaze mnogi predmeti manjih dimenzija.

Istraživanje u zapadnom i središnjem dijelu južne strane brodoloma rezultiralo je spoznajom o mogućem položaju brodske kuhinje, u kojoj su, uz veliku količinu keramičkih i dvije metalne posude, otkrivene i amfore tipa Lamboglia 2 manjih dimenzija od uobičajenih amfora iz brodskog tereta. (Radić Rossi, Yamafune 2023; Radić Rossi, Dorušić 2024).

Količina amfora za sada je procijenjena na 450, ali se čini da bi ih pod pijeskom moglo biti i više. Nalazi olovnih prečki antičkih sidara i pretpostavljenog valosjeka upućuju na položaj pramčanog dijela broda

**R**esearch on the well-preserved site near Cape Letavica on the island of Pag, ongoing since 2018 with brief interruptions, has yielded a large number of amphora stoppers and approximately one hundred ceramic and metal objects. In addition to two ancient lead anchors and a presumed cutwater discovered on the eastern side of the site, the majority of artifacts

have been found on the southern side, where numerous small objects continue to be uncovered.

Excavations in the western and central parts of the southern section of the shipwreck have led to the possible identification of the

ship's galley. In this area, alongside a large quantity of pottery and two metal vessels, Lamboglia 2 amphorae, smaller in size than the typical cargo amphorae, were discovered (Radić Rossi, Yamafune 2023; Radić Rossi, Dorušić 2024).

The total number of amphorae is currently estimated at 450, though there may be more buried beneath the sand. The discovery of two lead an-

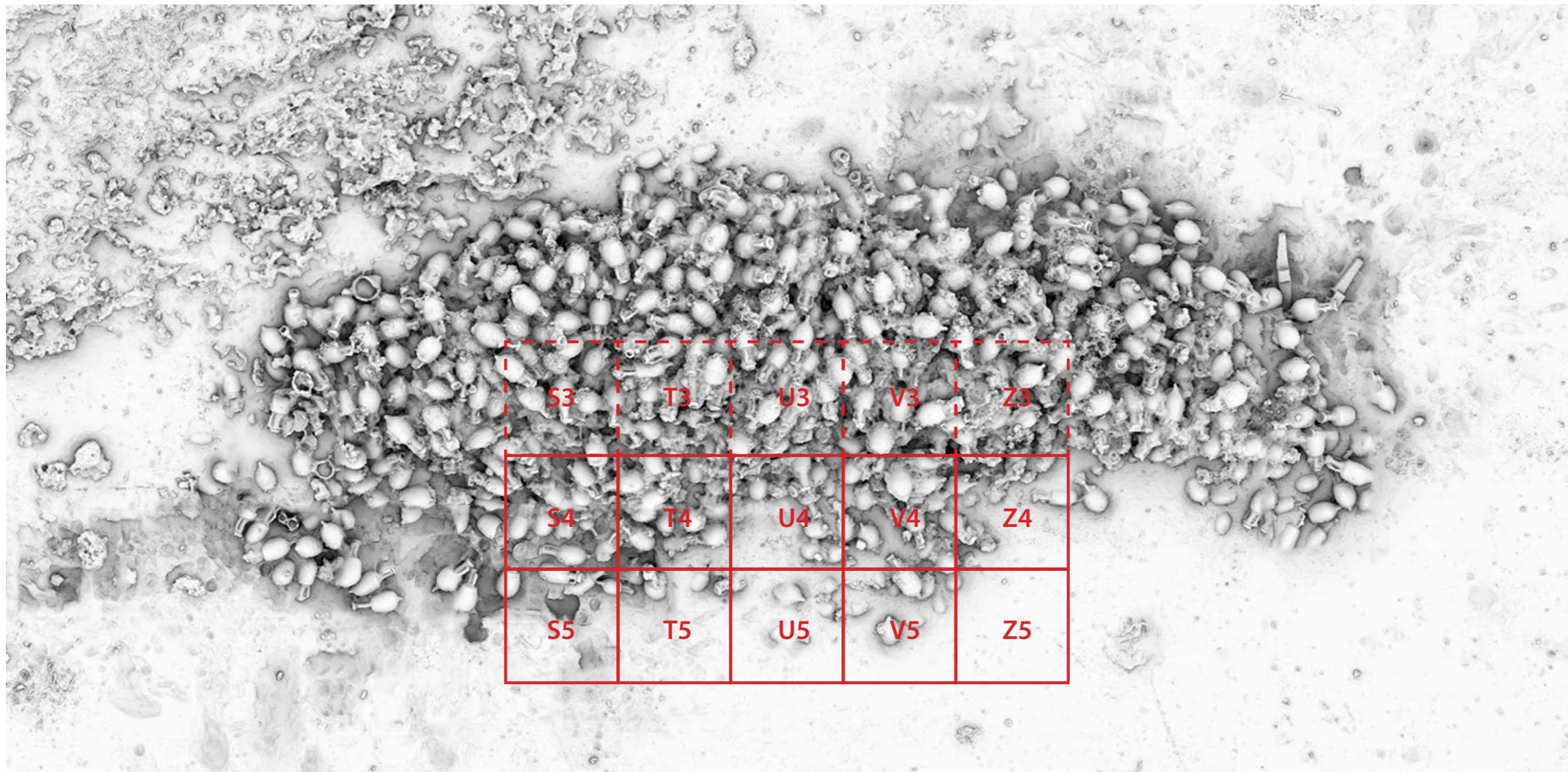


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Okvirni položaj pomoćnoga metalnog mrežišta 2024. godine (podloga: K. Yamafune)  
The approximate position of the auxiliary metal grid in 2024 (background: K. Yamafune)

the grid was extended to the east and west (S4, S5, V4, and V5). A few days later, two additional squares (Z4 and Z5) were added to the eastern side. The layout of the grid was determined based on the visible features of the site. It was placed beneath a large concentration of amphorae, with the goal of beginning the excavation in the virtual row 3, among the visible finds. Excavation in squares S3, T3, and Z3 continued until the end of the research campaign, while work in the other squares proceeded into rows 4 and 5. In squares U3 and V3, sediment removal was significantly hindered by the dense accumulation of concreted amphorae.

Initial activities focused on cleaning the accumulation of lead sheeting in squares T4 and U4, first discovered in the 2023 research campaign. During sediment removal, a partially preserved Pompeian red plate was found, wedged between two sheets of lead. Although the accumulation was thoroughly cleaned and individual pieces were carefully removed from the excavation area, its exact function remains uncertain. Given that the concentration is limited to just two squares, it is unlikely to represent remnants of hull sheathing used to protect the ship's exterior.

The recovered fragments showed overlapping lead sheets, and rows of large-headed metal nails were observed on the overlapping surfaces. However, due to heavy incrustation, precise measurements of the nails were not possible. In square U4, a wooden element resembling a lath was found attached to the lead sheeting. For documentation and sampling purposes, it was designated as T.2024.P5.

In square S3, a number of ceramic vessel fragments were recovered, including two planks (T.2024.P1 and T.2024.P2) and two frames (T.2024.F1 and T.2024.F2). Additionally, a metal object decorated with two duck heads was uncovered in the excavation profile. It is likely the handle of a *simpulum*, a vessel used for ritual libations, commonly found aboard ancient ships alongside a *patera* and *oenochoe*. A similar *simpulum* was discovered during the research of an ancient shipwreck in the Vela Svitnja bay on Vis, con-

s istočne strane nalazišta, a položaj amfora i keramičkog posuđa iz opreme brodske kuhinje sugeriraju da se brod pri potonuću nagnuo na desni bok.

Istraživanje je započelo okupljanjem istraživačkog tima i pripremnim radovima tijekom kojih je prikupljena oprema za istraživanje, pripremljeni sidreni brodovi, nabavljen kisik za punjenje ronilačkih boca mješavinom kisika i zraka te napravljene signature za amfore i ostale potencijalne nalaze.<sup>1</sup>

Dana 31. listopada započele su ronilačke aktivnosti na nalazištu. Prije svega, postavljeno je pomoćno metalno mrežište koje se u početku sastojalo od četiriju kvadrata (T4, T5 i U4, U5). Sljedećeg dana mrežište je prošireno u smjeru istoka i zapada (S4, S5 i V4, V5), a nakon nekoliko dana na istočni su dio dodana još dva kvadrata (Z4 i Z5). Položaj mrežišta bio je uvjetovan izgledom nalazišta. Mrežište je postavljeno pod veliku

chor stocks and a presumed cutwater suggests the bow of the ship was located on the eastern side of the site. Meanwhile, the distribution of amphorae and ceramic galley equipment implies that the ship tilted to its starboard side as it sank.

The research began with the assembly of the research team and initial preparatory work. During this phase, the necessary equipment was gathered, anchor boats were prepared, and oxygen was procured to fill diving tanks with a mixture of oxygen and air. Labels were also prepared for amphorae and other potential finds.<sup>1</sup>

Diving activities at the site commenced on October 31. The first task was the installation of the auxiliary metal grid, initially consisting of four squares (T4, T5, U4, and U5). The following day,

skupinu amfora, s ciljem da se istraživanje započne u virtualnim kvadratima reda 3, među vidljivim amforama. Istraživanje u kvadratima S3, T3 i Z3 nastavilo se do kraja istraživačke kampanje, dok se u ostalim kvadratima pomaknulo u redove 4 i 5. U kvadratima U3 i V3 uklanjanje sedimenta uglavnom je zapriječila velika količina međusobno sraslih amfora.

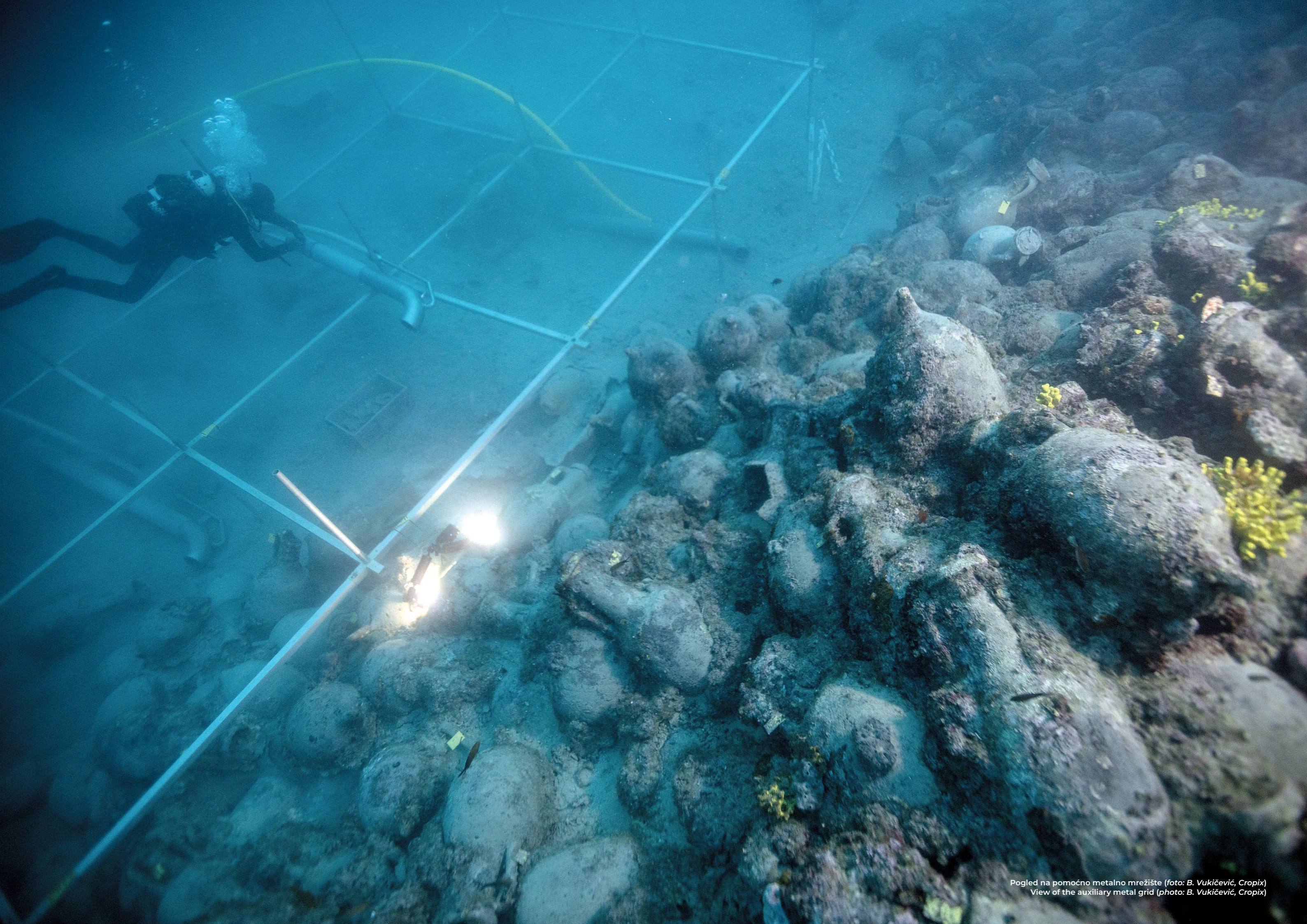
Početne aktivnosti bile su usmjerene na čišćenje nakupine olovnog lima u kvadratima T4 i U4, otkrivenog tijekom istraživačke kampanje 2023. Pri uklanjanju sedimenta otkriven je jedan djelomično očuvan pompejanski crveni tanjur koji je bio zaglavljen između dviju limenih ploča. Usprkos činjenici da je nakupina lima detaljnije očišćena, a odvojeni komadi izvađeni iz sonde, još uvijek nije moguće sa sigurnošću pretpostaviti njegovu pravu namjenu. S obzirom na to da je koncentriran samo u dvama kvadratima, nije vjerojatno da je u pitanju ostatak obloge koja je štitila brodsku oplatu.

Na izvađenim ulomcima primijećeno je preklapanje olovnog lima, a na preklapljenim površinama primijećeni su nizovi metalnih čavala s prilično

<sup>1</sup> Istraživanje u organizaciji Sveučilišta u Zadru vodila je Irena Radić Rossi. Ulogu zamjenika voditelja obnašao je Mate Parica, a ulogu voditelja ronjenja Vedran Dorušić. U istraživanju su sudjelovali arheolozi Alice Lucchini sa Sveučilišta u Zadru te Dušanka Romanović i Dino Taras iz Arheološkog muzeja u Zadru. Ostali članovi istraživačke ekipe bili su profesionalni ronionci i volonteri iz Hrvatske i Slovenije.

<sup>1</sup> The research, organized by the University of Zadar, was led by Irena Radić Rossi, with Mate Parica serving as deputy leader and Vedran Dorušić as diving coordinator. Participating archaeologists included Alice Lucchini from the University of Zadar, as well as Dušanka Romanović and Dino Taras from the Archaeological Museum in Zadar. The research team also included professional divers and volunteers from Croatia and Slovenia.





Pogled na pomoćno metalno mrežište (foto: B. Vukičević, Cropix)  
View of the auxiliary metal grid (photo: B. Vukičević, Cropix)



Ulomak platice LE.2024.P1 i rebra LE.2024.F1 u kvadratu S3 (foto: V. Dorušić)  
Fragment of the plank LE.2024.P1 and the frame LE.2024.F1 in square S3 (photo: V. Dorušić)

velikim glavicama koje je, zbog inkrustacija, teško preciznije izmjeriti. Na olovnom limu u kvadratu U4 uočen je jedan drveni element koji slični platici, a za potrebe dokumentiranja i uzorkovanja drvene građe označen je oznakom T.2024.P5.

U kvadratu S3 pronađena je određena količina ulomaka keramičkog posuđa, a uočene su i dvije platice (T.2024.P1 i T.2024.P2) te dva rebra (T.2024.F1 i T.2024.F2). U profilu iskopa pronađen je i metalni element ukrašen dvjema pačjim glavicama, koji se vjerojatno

ducted in the 1970s (Radić Rossi 2006). An astragalus (knucklebone) was also found in the same square, suggesting that at least four may have been originally present, likely used in games of chance.

Of particular interest was a completely preserved glass vessel discovered in square U4, resting on the upper side of amphora no. 306. This amber-colored ovoid vessel, produced using the casting technique, features a rounded bottom



a) Pronalazak staklene čaše u kvadratu U4 (foto: B. Vukičević, Cropix); b) Potpuno očuvana staklena čaša (foto: N. Lete)  
a) Finding of a glass cup in square U4 (photo: B. Vukičević, Cropix); fully preserved glass cup (photo: N. Lete)



a) Pronalazak ručke simpuluma u kvadratu S3 (foto: B. Vukičević, Cropix); b) Ručka simpuluma (foto: D. Romanović)  
a) Finding the handle of the *simpulum* in square S3 (photo: B. Vukičević, Cropix); b) The handle of the *simpulum* (photo: D. Romanović)

može identificirati kao ručka simpuluma. Riječ je o predmetu koji se uz pateru i enohju upotrebljavao za obredne žrtve ljevanice, uobičajene na antičkim brodovima. Sličan *simpulum* pronađen je tijekom istraživanja antičkog brodoloma u uvali Veloj Svitnji na Visu, provedenog sedamdesetih godina prošlog stoljeća (Radić Rossi 2006). U istom kvadratu pronađen je i jedan astragal, a pretpostavlja se da ih je bilo najmanje četiri te da su se rabili za igre na sreću.

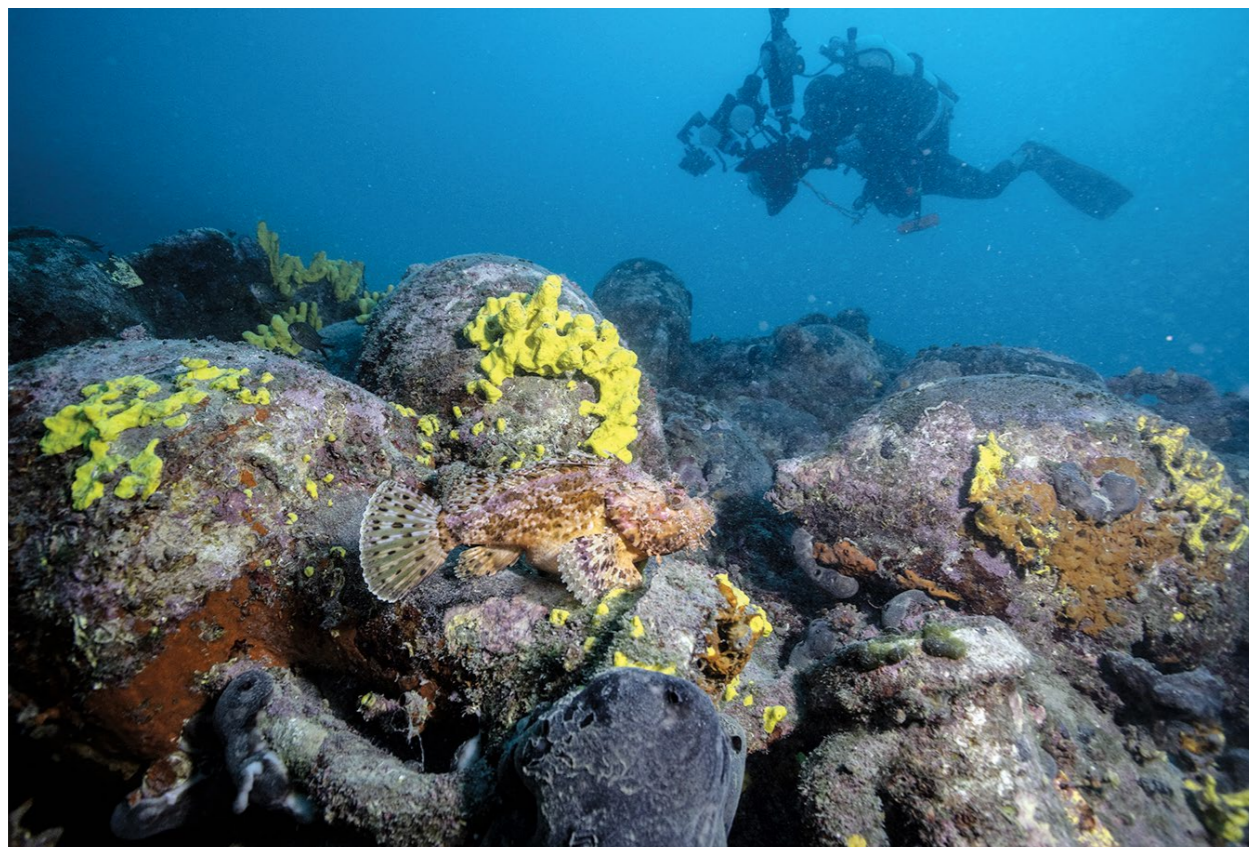
Posebnu pozornost privukla je potpuno očuvana staklena posuda pronađena u kvadratu U4, s gornje strane amfore br. 306. Riječ je o jajolikoj staklenoj posudi boje jantara, izrađenoj tehnikom lijevanja,

and is decorated with parallel grooves (cf. Davidson Weinberg 1970: 20, 23). Such vessels are rare not only in Croatian archaeological contexts but also throughout the Mediterranean.<sup>2</sup>

Several complete ceramic vessels were found in squares T3, T4, U4, and V4. Among them, a fully preserved ceramic jug stands out, discovered beside amphora no. 313 in the southern part of square T3. In square Z3, a round object was observed, which was later identified as the upper

<sup>2</sup> We would like to thank Berislav Štefanac of the Museum of Ancient Glass for his assistance in identifying the find.





Kulturna i prirodna baština na nalazištu (foto: B. Vukičević, Cropix)  
Cultural and natural heritage at the site (photo: B. Vukičević, Cropix)

zaobljenoj pri dnu, i ukrašenoj paralelnim žljebovima (usp. Davidson Weinberg 1970: 20, 23). Takve posude rijetkost su u hrvatskim, ali i mediteranskim arheološkim kontekstima.<sup>2</sup>

U kvadratima T3, T4, U4 i V4 pronađeno je nekoliko čitavih keramičkih posuda, među kojima se izdvaja potpuno očuvan keramički vrč, pronađen uz amforu br. 313 u južnom dijelu kvadrata T3. U kvadratu Z3 uočen je okrugli predmet za koji je tijekom vremena utvrđeno kako je riječ o gornjem dijelu kuglastoga metalnog recipijenta. U čitavom iskopu pronađeno je 49 diskoidnih čepova amfora, većinom lijevanih u dvodijelnim kalupima, koji se mogu grupirati ovisno o simbolima na njihovim gornjim površinama. Osim u okolnom sedimentu, nekoliko je čepova pronađeno uglavljeno u grla amfora.

Tijekom radova nastavilo se otkrivati amfore s južne strane nalazišta pa je odlučeno da se one označe, a dio amfora iz kvadrata S3, T4, U4 i Z3 ukloni kako bi se olakšalo napredovanje iskopa. Sve amfore koje su uklonjene s nalazišta položene su sa zapadne strane, u blizini bloka na kojemu je pričvršćena plo-

portion of a spherical metal container. A total of 49 discoid amphora stoppers were recovered in the excavated area. Most of these were cast in two-part molds and can be categorized based on the symbols present on their upper surfaces. In addition to surrounding sediment, several stoppers were found embedded in the necks of amphorae.

As amphorae continued to be uncovered on the southern side of the site, a decision was made to mark them and remove selected amphorae from squares S3, T4, U4, and Z3 to facilitate further excavation. All removed amphorae were placed on the west side of the site, near the block bearing the sign indicating that the site has been designated as a 'UNESCO Best Practice' location. The condition of the site was documented twice using photogrammetry—first to track changes within the excavation squares, and then to record the final state of the site.

This year, an analysis of the wood species used in the ship's construction was also carried out. The analysis was conducted by Alice Lucchini, postdoctoral researcher at the University of Zadar. Although the samples consisted mostly of isolated elements, detached from the main structure,

Tablica 1. Rezultati analize vrste drvene građe iskorištene za izradu brodske konstrukcije (analiza 2022: A. Ferreira Dominguez; analiza 2024: A. Lucchini)

Table 1 Results of the wood species analysis of the timbers used for the construction of the ship (analysis 2022: A. Ferreira Dominguez; analysis 2024: A. Lucchini)

Oznaka / Label	Element / Element	Položaj / Position	Vrsta drveta / Wood species
LE.2022.P-1	platica / plank	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.P-2	platica / plank	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.P-3	platica / plank	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.P-4	platica / plank	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.F-1	rebro / frame	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.UM-1	nepoznati element / unidentified member	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.UM-2	nepoznati element / unidentified member	A1	brijest / elm ( <i>Ulmus</i> sp.)
LE.2022.UM-3	nepoznati element / unidentified member	A1	hrast crnika / holm oak ( <i>Quercus ilex</i> L.)
LE.2022.UM-4	nepoznati element / unidentified member	A1	hrast crnika / holm oak ( <i>Quercus ilex</i> L.)
LE.2022.P-1-TREENAIL	drveni čavao / treenail	A1	maslina / olive tree ( <i>Olea europaea</i> L.)
LE.2022.P-2-TREENAIL	drveni čavao / treenail	A1	maslina / olive tree ( <i>Olea europaea</i> L.)
LE.2022.P-1-TENON	jezičac / tenon	A1	hrast crnika / holm oak ( <i>Quercus ilex</i> L.)
LE.2022.P-2-TENON	jezičac / tenon	A1	hrast crnika / holm oak ( <i>Quercus ilex</i> L.)
LE.2022.ANCHOR	drvo sidra / wood of the anchor	C2	hrast crnika / holm oak ( <i>Quercus ilex</i> L.)
LE.2024.F1	rebro / frame	S3	brijest / elm ( <i>Ulmus</i> sp.)
LE.2024.F2	rebro / frame	S3	brijest / elm ( <i>Ulmus</i> sp.)
LE.2024.P1	platica / plank	S3	brijest / elm ( <i>Ulmus</i> sp.)
LE.2024.P2	platica / plank	S3	brijest / elm ( <i>Ulmus</i> sp.)
LE.2024.P5	platica / plank	U4	brijest / elm ( <i>Ulmus</i> sp.)

ča koja upućuje na to da je nalazište označeno kao „UNESCO Best Practice“. Stanje na nalazištu dva je puta fotogrametrijski snimljeno kako bi se pratile promjene u kvadratima i zabilježila završna situacija.

I ove je godine provedena i analiza vrsta drvene građe iskorištene za izradu brodske konstrukcije. Analizu je provela Alba Ferreira Dominguez iz francuske udruge IPSO FACTO. Iako je riječ tek o pojedinačnim nalazima, uglavnom izdvojenima iz cjeline broda, bilo je lako raspoznati rebra i platice. Iz dobivenih rezultata vidljivo je da su svi analizirani elementi bili izrađeni od

features such as frames and planks were clearly identifiable. The results revealed that all analyzed components were made of elm wood (*Ulmus* sp.), which is consistent with the results from the 2022 analysis.

The research at the Cape Letavica site on the island of Pag exemplifies the careful study and preservation of finds lying *in situ* at depths between 34 and 38 meters. The site is fully open to tourist dives, guided by the Foka Diving Centre. In addition to numerous volunteers, experts

<sup>2</sup> Zahvaljujemo Berislavu Štefancu iz Muzeja antičkog stakla na pomoći pri identifikaciji nalaza.





drвета brijesta (*Ulmus sp.*), što se poklapa s analizom elemenata izvađenih 2022. godine (Tab. 1).

Istraživanje nalazišta kod rta Letavice na otoku Pagu primjer je brige o skupini nalaza koji leže *in situ* na dubini od 34 do 38 m. Nalazište je potpuno otvoreno za turističke obilaske u pratnji voditelja ronjenja Ronilačkog centra *Foka*, a uz brojne volontere u istraživanju sudjeluju stručnjaci Sveučilišta u Zadru, Arheološkog muzeja Zadar te povremeno i stručnjaci Međunarodnog centra za podvodnu arheologiju u Zadru i Hrvatskoga restauratorskog zavoda.

U rubnim dijelovima nalazišta do sada su otkrivene dvije olovne prečke antičkih olovno-drvenih sidara, predmet nalik na valosjek i posuđe iz brodske kuhinje. S obzirom na veliku količinu sitnih nalaza, posebno s južne strane brodoloma, istraživanje na tom prostoru potrebno je nastaviti kako bi se dobila čim cjelovitija slika potopljenog broda, a sitni nalazi zaštitili od ispadanja iz profila morskog dna. Osim toga, cilj je istražiti nalazište sa svih dostupnih strana kako bi se priča o brodolomu obogatila arheološkim podacima i nalazima te postala još zanimljivija za turističku prezentaciju.

from the University of Zadar, the Archaeological Museum Zadar, and occasionally specialists from the International Centre for Underwater Archaeology in Zadar and the Croatian Restoration Institute have actively participated in the research.

In the peripheral areas of the site, two lead anchor stocks from ancient lead-wood anchors, an object resembling a cutwater, and vessels from a ship's galley have been discovered. Given the abundance of small finds, particularly on the southern side of the shipwreck, continued research is necessary to develop a more complete understanding of the sunken ship and to protect these small artifacts from becoming dislodged from the seabed. Furthermore, the goal remains to explore the site from all accessible directions to enrich the archaeological narrative of the shipwreck and enhance its appeal for tourist presentations.

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