

# Translation from Croatian into English: Translation and Analysis of Three Different Texts

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SVEUČILIŠTE U RIJECI  
FILOZOFSKI FAKULTET  
KATEDRA ZA TRANSLATOLOGIJU

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**TRANSLATION FROM CROATIAN INTO ENGLISH:  
TRANSLATION AND ANALYSIS OF THREE DIFFERENT TEXTS**

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UNIVERSITY OF RIJEKA  
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TRANSLATION AND ANALYSIS OF THREE DIFFERENT TEXTS**

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**Supervisor:**

**Nikola Tutek, Dr. sc. Phil.**

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## ABSTRACT

This thesis deals with the process of translating three texts from Croatian into the English language – an interview dealing with an art exhibition, and two scientific texts, one concerning marine biology and the other discussing gray wolves. Post introduction, the source texts (STs) are presented alongside their corresponding introductory remarks. The challenges encountered during the process of translation, along with the approaches that are necessary to overcome them, are explained in the commentary and analyses sections, which follow the translations of each text. The conclusion discloses how translators have to adapt linguistically and culturally to the target language to overcome the aforementioned challenges. Finally, the importance of context, genre and intended audience in producing a successful translation is highlighted in this thesis.

Key words: *translation, Croatian, English, commentary, analyses, solutions, scientific text, interview, marine biology*

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# 1. INTRODUCTION

Translation is a process which involves transforming the intended meaning from the source language into the correspondent meaning in the target language. Translational practice poses a number of obstacles that can impede the effectiveness and accuracy of language in the target text. These pitfalls of translation include differences in grammar and syntax, differences in semantics, and cultural concepts and connotations which have no direct equivalents in the target language. Without an extensive knowledge of how to deal with these challenges, one can provide a translation which is inaccurate, confusing, or even misleading.

A translator's role is significantly more important than simply replacing the words from one language into its equivalents in another language, as Mona Baker states in the Routledge Encyclopedia of Translation Studies:

*The translator is the expert whose task it is to produce message transmitters for use in transcultural message transfer. To do this, the translator must, at a particular place and at a particular time, produce a particular product for a particular purpose. The translator's actions must be informed by suitable data, and must be carried out accordingly to specifically negotiated conditions. Finally, the process must be completed by a deadline. Translational action therefore involves not only the translator as translation expert, but also the client/commissioner with whom the translator must negotiate cooperatively.<sup>1</sup>*

Apart from having profound knowledge of the target language and its culture, translators must also consider the target audience and the purpose of the translation. They must provide an accurate translation but also succeed in evoking the same reaction in the target audience to the one elicited by the source text. Style and tone might differ depending on whether the target audience is a specialized group or general public, and it is crucial to understand the purpose of the text (e.g., informative, or entertaining purpose).

In addition to the purpose and tone of the text, translators act as proofreaders and editors. The translation must be grammatically correct, well-structured and in the spirit of the target language. To provide an accurate translation, a high level of proficiency and knowledge of grammar and syntax is required in both the source language, as well as in the target language(s).

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<sup>1</sup> Baker, Mona (2005): *Routledge Encyclopedia of Translation Studies*. Taylor & Francis e-Library, p. 4

Ultimately, the goal of translators is to produce a translation which effectively communicates the meaning of the source text to the target audience. To reach that goal, there is a significant number of steps translators must follow.

Before the translation process commences, translators must make themselves familiar with the source text. After comprehending all the information regarding a text, i.e., intended meaning, level of formality and genre, translators can then decide which translatorial approach to use and determine which problems might arise during the translation process. During the translation process, translators can face a wide range of challenges and problems. Some of the common technical difficulties translators face include ambiguous terminology, culture specific references, different style and tone of a text, formatting, layouts, as well as time constraints.

In this thesis, I showcased the process translators follow, and highlighted the different issues encountered while translating different texts. Two of the texts translated are of scientific genre and one is an interview, accompanied by brief introductory remarks of each source text, followed by the final translations. Finally, I have provided translation workflows which contain the examples of difficulties encountered and strategies used to provide an accurate translation, along with explanations as to why I believe a specific option is more appropriate.

## 2. Source text 1 – Introductory Remarks

The first source text is a scientific paper titled *Važnost školjkaša Corbula gibba (Olivi, 1792) (Corbulidae, Mollusca Bivalvia) u obnovi pridnenih zajednica u sjevernom Jadranu* written by Mirjana Hrs-Brenko extracted from the journal *Pomorski zbornik*. The text focuses on scientific research of marine organisms and how changes in environment, such as oxygen shortages, affect their reproduction and overall lifespan.

This type of a scientific research paper follows a specific structure and contains technical terminology closely related to the field of marine biology. Such texts belong to the domain of specialized translation. Specialized translation includes legal, medical, technical, financial, and scientific texts. The process of translating such specialized texts requires expertise in each field, as well as an in-depth knowledge on the concepts and terminology used. To translate such texts effectively, it is imperative to consult experts, and use specialized dictionaries and other recommended resources.

Apart from the translation of the text, I have provided an elaborate workflow regarding the challenges I have encountered while translating this text. The main issue was the terminology, and I would like to give my thanks to professors dr.sc. Andrej Jaklin, dr.sc. Nastjenka Supić and dr.sc. Mirjana Najdek Dragić from the Ruđer Bošković Institute, Center for Marine Research, who took their time to elaborate on the many unknown terms found in this ST. Since there is no universal Croatian-English dictionary for marine biology, I have included the explanations of these terms into this thesis, so that it can be of use to future generations who decide to translate similar topics.



## 2.1 SOURCE TEXT 1

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### **Važnost školjkaša *Corbula gibba* (Olivi, 1792) (*Corbulidae*, *Mollusca Bivalvia*) u obnovi pridnenih zajednica u sjevernom Jadranu**

#### **1. Uvod**

Sjeverni Jadran se ubraja među osjetljivije morske ekosustave u svijetu. Područje sjevernog Jadrana je zatvoreno i relativno plitko, prosječne dubine do 30 m, s brojnim dotocima zamuljenih slatkih voda, obogaćenih hranjivim solima i zagađivalima. Hipoksična stanja uz dno javljaju se u godinama poremećenih odnosa hidrometeoroloških prilika (snižena površinska slanost, povišena temperatura vode, dugotrajno razdoblje sunčanog i mirnog vremena, povišeni barometarski tlak, smanjeno vertikalno i horizontalno miješanje vode). Prilikom jačih prodora slatkih voda, obogaćenih hranjivim solima, od ušća rijeke Po do istarske obale, putem WE transversalne površinske struje (Sl. 1), u proljeće i rano ljeto, značajno se povisuje primarna proizvodnja organske tvari s pojavom sluzavih tvorevina "cvjetanje mora" u cijelom vodenom stupcu. Taloženjem i raspadom sluzavih masa na dnu nastaju hipoksična i čak anoksična stanja sa značajnim ugibajima pridnenih organizama osjetljivih na nestašice kisika.

Dosadašnjim istraživanjima potvrđena je otpornost školjkaša na nestašice kisika, posebice vrsta zakopanih u sediment. Infaunalne vrste kao *Corbula gibba*, *Mysia undata* i *Nucula* sp. preživjele su nestašicu kisika na postaji SJ-007, u sjevernom Jadranu u jesen 1989. godine.

Nakon pomora, pridnene zajednice osiromašene vrstama, s dovoljno slobodnog prostora za naseljavanje novaka, pružile su izvanrednu priliku za utvrđivanje reprodukcijskog potencijala, prvenstveno onih vrsta čije je naseljavanje uslijedilo odmah nakon krize kisika u pridnenom sloju vode. Zbog brojnosti preživjelih jedinki i intenzivnog naseljavanja u ranom periodu obnove opustošenih zajednica dna za populacijska istraživanja je izabran školjkaš *Corbula gibba* u cilju utvrđivanja njene ekološke važnosti u ekosustavu sjevernog Jadrana.

## **2. Materijal i metode rada**

Za populacijsku analizu korbule, *Corbula gibba* (Olivi, 1792), skupljeni su školjkaši na postaji SJ-007 (45° 17.0' N - 13° 16.0' E), s muljevitog pijeska na 30 m dubine, od veljače 1990. do prosinca 1991. godine (Sl. 1). Pridneni materijal je uzorkovan sa 0,4 m<sup>2</sup> površine dna Van Veenovim grabilom (0,1 m<sup>2</sup>) i prosijan kroz sita (2 mm oka), te sačuvan u 4% neutralnom formolu do obrade u laboratoriju.

U laboratoriju su korbule sa zatvorenim ljušturama odvojene od drugih vrsta makrofaune. Mnogobrojne zatvorene korbule bile su prazne ili ispunjene muljem. Za populacijsku analizu korištene su isključivo žive jedinke. Dužina ljuštura živih jedinki, tj. udaljenost od prednjeg do stražnjeg ruba ljušture, izmjerena je pomičnim mjerilom (nonij). Obrađeno je 15 uzoraka s ukupno 5.973 korbula od toga 2.508 živih i 3.465 jedinki sa zatvorenim, ali praznim ljušturama, te 17.809 primjeraka ostalih vrsta makrofaune. Broj živih korbula po uzorku preračunat je na 1 m<sup>2</sup>.

## **3. Rezultati i diskusija**

### **3.1. Populacijska gustoća**

U provedenim dvogodišnjim istraživanjima, na postaji SJ-007, mjesečna populacijska gustoća korbule se kretala od 8 jed./m<sup>2</sup> (rujan 1991.) do 1.150 jed./m<sup>2</sup> (srpanj 1990.), sa srednjom gustoćom 395 ± 155,81 jed./m<sup>2</sup>. Razlike u mjesečnim populacijskim gustoćama pripisuju se intenzitetu naseljavanja i preživljavanja jedinki (Tab.1). Postaja SJ-007 nalazi se

sjeverno od linije ušće rijeke Po-Rovinj (Sl. 1), u zoni gdje su i tijekom ranijih istraživanja, na više postaja, zabilježene guste populacije korbule, čak više od 1.000 ind./m<sup>2</sup> dna.

Tablica 1. Populacijska gustoća korbule (*Corbula gibba*), prema broju jedinki na m<sup>2</sup>, na postaji SJ-007 u 1990. i 1991. godini.

Datum	Broj jed /m <sup>2</sup>	Datum	Broj jed /m <sup>2</sup>
-	-	25.01.1991.	88
24.02.1990.	153	28.02.1991.	148
29.03.1990.	330	-	-
25.04.1990.	398	02.04.1991.	180
-	-	-	-
01.06.1990.	975	-	-
05.07.1990.	1150	-	-
15.08.1990.	785	13.08.1991.	35
13.09.1990.	970	25.09.1991.	8
14.10.1990.	878	-	-
-	-	-	-
20.12.1990.	128	17.12.1991.	28
ukupno: jed /m <sup>2</sup> /god.	5.767		907

### 3.2. Naseljavanje novaka

Na postaji SJ-007, nakon pomora makrofaune u studenom 1989 godine, naseljavanje korbule bilo je kontinuirano, ali promjenljive jakosti. Novaci, 2 mm dužine, nađeni su u svim mjesecima 1990. godine, a samo rijetke jedinke tijekom 1991. godine (Sl. 2). Pretpostavlja se da su prvi zabilježeni novaci u veljači i ožujku 1990. godine, vjerojatno mriješteni krajem 1989. godine. Obilnost novaka u novoj zajednici početkom 1990. godine uslijedila je nakon uspješnog mriještenja, ličinačkog razvoja i preživljavanja u planktonu, te naseljavanja zrelih ličinaka između rijetkih preživjelih predatorskih vrsta meiofaune i makrofaune. Korbula je oviparna vrsta s velikom proizvodnjom jajnih stanica, vanjskom oplodnjom i dugim razvojem ličinki u planktonu, a time mogućim širenjem areala rasprostranjenja putem struja. Stoga su najvjerojatnije pridnenu zajednicu na postaji SJ-007 naselile ličinke korbule donesene strujama iz susjednih zona, a u kasno proljeće i ljeto 1990. godine sezonskom, transverzalnom

površinskom strujom (Po-Rovinj) (Sl. 1) iz gusto naseljenih sjevernih i zapadnih zona sjevernog Jadrana.

Značajne razlike u brojnosti novaka u istraživanim godinama ukazale su na visoki potencijal naseljavanja korbule u ranom periodu obnove pridnene zajednice. Međutim, taj se potencijal znatno snizio u 1991. godini, po svoj prilici, zbog obnove predatorskih populacija krajem 1990. godine. Zbog brzog i obilnog naseljavanja, nakon krize kisikom, korbula se ubraja u "oportunističke" vrste s dominacijom juvenilnih stadija u pridnenim posthipoksičnim sredinama.

### **3.3. Rast i životni ciklus**

Tijekom proljeća 1990. godine intenzivan rast korbule, karakteriziran postupnim pomakom vrhova histograma od 2 mm (veljača 1990.) do 6 mm razredne dužine (lipanj 1990.) (Sl. 2), pripisuje se redovitom proljetnom cvatu fitoplanktona, koji koristi korbula kao "suspension feeding" vrsta. U prilog tome je navod Boon & Duinevelde da su polunezasićene masne kiseline fitoplanktonskog podrijetla važne u lancu ishrane mnogih bentoskih vrsta. Usporenje rasta korbule u ljeto i jesen 1990. godine dovodi se u vezu, kako navode Bonvicini-Pagliai & Serpagli, s ljetnim prestankom rasta ljuštura korbule zbog jesenje gametogenetske aktivnosti, dok Boon i sur. ističu i povišenu bakterijsku aktivnost u kompeticiji za hranu s makrofaunom kod viših ljetnih temperatura.

Od prosinca 1990. godine odrasle korbule dominiraju u višim dužinskim razredima s postupnim smanjenjem ukupnog broja jedinki do sredine 1991. godine (Sl. 2). Prema populacijskoj dinamici rasta jedinki, naseljenih nakon pomora, životni ciklus korbule trajao bi između jedne i pol do dvije godine. Kratak životni ciklus korbule navode i Aleffi i sur. za Tršćanski zaljev.

### **3.4. Smrtnost**

Korbula, kao stanovnik nestabilnih staništa, dobro podnosi razne stresne situacije sredine zahvaljujući sposobnosti čvrstog zatvaranja ljuštura i prelasku na anaerobni metabolizam, korištenjem biokemijskih zaštitnih mehanizama.

Inter i intraspecijski odnosi, kao kompeticija za hranu i prostor, a posebice predatorstvo važni su biotski regulatori veličina populacija pojedinih vrsta unutar određene pridnene

zajednice. U provedenim istraživanjima, kompeticija za hranu uzrokovala je smrtnost novaka korbule do 45%, samo unutar 2 mm dužinskog razreda u ožujku 1990. godine. Kako su novaci imali prozirne, zatvorene, neoštećene i prazne ljuštore, ugibanje se pripisuje manjku hrane. Ipak, gubici novaka zbog gladovanja nisu značajno poremetili postupno povećanje populacije prema ljetu 1990. godine. Istovremeno, kompeticija za prostor između rijetkih preživjelih pridnenih vrsta i zrelih ličinki korbule bila je niska, dajući tako dovoljno prostora ličinkama korbule za masovno naseljavanje, dobro preživljavanje i dominaciju nad ostalim vrstama makrofaune u zajednici sve do kraja 1990. godine (Sl. 2, 3).

Ipak, čini se da je za populacijski porast korbule do kraja ljeta 1990. godine najviše odgovoran pomor većine predatorskih vrsta u jesen 1989. godine. Tako je tijekom 1990. godine učinak predatora bio sveden na minimum, te zrele ličinke korbule spuštanjem prema dnu, nisu bile eliminirane filtracijskom aktivnosti "suspension feeder" vrsta, a naseljeni novaci predatorstvom vrsta meiofaune i makrofaune.

Prema literaturnim izvorima, najopasniji predatori školjkaša su zvjezdače, u čijim želucima su nađene i korbule. Međutim, zapaženi su slučajevi izbacivanja živih odraslih korbula nakon višednevnog boravka u želucu zvjezdača, što nije bio slučaj s juvenilnim stadijima. S vjerojatnošću se pretpostavlja da su baš repopulirane zvjezdače predacijom dobrim dijelom uklonile korbule manjih dimenzija u jesen 1990. godine (Sl. 2). Mogući predatori su dekapodni raci iz porodica Portunidae i Pilumnidae (Z. Štević, usmeno priopćenje) i ribe iz porodice Sparidae, te plosnatice (red Heterosomata) (M. Kovačić, usmeno priopćenje). Utvrđeno je da za krize kisika znatan broj predatorskih vrsta stradava, a mnoge ribe napuštaju ugrožene zone. Prema tome, trebalo je vremena za obnovu njihovih populacija ili za povratak odraslih u ranije zajednice dna kako bi njihova predatorska aktivnost mogla ponovno doći do izražaja. Mesojedi-puževi iz porodica Muricidae i Naticidae su, također, predatori korbule, ali slabijeg učinka. Naime, često su uzorkovane žive korbule s neprobušenim rupama na ljušturama. Prema literaturi poseban zaštitni sloj u unutarnjem dijelu ljuštore korbule sprječava prodor puža do mekih dijelova tijela, dajući tako korbulama više šanse za preživljavanje, što nije slučaj s drugim vrstama školjkaša.

I na kraju, odrasle korbule, preživjevši štetne utjecaje abiotskih i biotskih čimbenika okoliša, ugibale su prirodnom smrću. U veljači 1990. godini izmjerena je najduža živa korbula 14,7 mm, koja je preživjela hipoksiju i vjerojatno bi ubrzo uginula prirodnom smrću da nije bila uzorkovana, jer prema Nordsiecku i Poppe & Gotou maksimalne dužine za korbule iznose 15 do 16 mm.

#### 4. Zaključak

Dvogodišnja istraživanja populacijske dinamike korbule, *Corbula gibba*, nakon ekološke katastrofe 1989. godine, upotpunila su dosadašnje znanje o korbuli i potvrdila njenu važnost tijekom obnove naselja u pridnenim zajednicama sjevernog Jadrana.

Ukratko, korbula je mala kratkoživuća vrsta, plitko zakopana u zamuljenim sedimentima, i gusto naseljena u nestabilnim staništima s povišenom sedimentacijom i bogatstvom organskih tvari. Kao vrsta otporna na sniženje kisika, korbula dobro preživljava hipoksična stanja uz dno. Nakon pomora brojnih pridnenih vrsta, osjetljivih na nestašice kisika u jesen 1989. godine, sljedeće je godine došla do izražaja visoka plodnost korbule sa značajnim novačenjem u pridnenu zajednicu. U oštećenoj zajednici, pojavom niskog biodiverziteta, odnosno smanjenog broja vrsta makrofaune, smanjena je kompeticija za prostor omogućivši obilno naseljavanje zrelih ličinki korbule i nekih drugih pridnenih vrsta. U 1990. godini korbula, kao oportunističku vrsta, intenzivnim novačenjem označila je početak obnove stresom pogođenu zajednicu. Poradi dominacije nad drugim vrstama makrofaune i intenzivne filtracijske aktivnosti korbula postaje važan prenositelj proizvedene organske tvari od fitoplanktona do bentosa, baš u vrijeme nestanka mnogih "suspension feeding" vrsta u pridnenom sloju vode. Od kraja 1990. godine veličina populacije korbule znatno se smanjila, vjerojatno poradi pojačane kompeticije i predatorske aktivnosti. U 1991. godini prevladavale su odrasle jedinke, a s njihovim postupnim nestajanjem do sredine 1991. godine potvrđen je kratak životni ciklus korbule.

#### *Zahvala*

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## 2.2 Translation of source text 1

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### **The Role of Bivalve *Corbula gibba* (Olivi, 1792) (Corbulidae, Mollusca Bivalvia) in the Recruitment of Benthic Communities in the Northern Adriatic**

#### **1. Introduction**

The northern Adriatic is considered one of the more vulnerable marine ecosystems in the world. The area of the northern Adriatic is closed and relatively shallow, with an average depth of up to 30 m, with numerous inflows of silty fresh waters, enriched with nutrient salts and pollutants. Hypoxic conditions in the near bottom layer occur during the times of disturbed hydrometeorological conditions (lower surface salinity, increased water temperature, long period of sunny and calm weather, increased barometric pressure, reduced vertical and horizontal mixing of water). In spring and early summer, during stronger inflows of fresh water (enriched with nutrient salts), from the mouth of the River Po to the Istrian coast via the transversal current connecting the western and the eastern part of the northern Adriatic (Fig. 1), the primary production of organic matter with the appearance of slimy *algal bloom* in the entire water column is significantly increased. Slimy matter sedimentation and decomposition at the seabed produce hypoxic and even anoxic conditions with significant mortality of benthic organisms sensitive to oxygen shortages.

Research to date has confirmed the resistance of bivalves to oxygen shortages, especially of species buried in sediment. Infaunal species such as *Corbula gibba*, *Mysia undata* and *Nucula* sp. survived the oxygen shortage at the SJ-007 station in the northern Adriatic in the

autumn of 1989.

After the mass mortality, species-depleted benthic communities, with enough free space to settle newly recruited clams, provided an extraordinary opportunity to determine the reproduction potential primarily of those species whose colonization occurred immediately after the oxygen crisis in the near bottom layer. The bivalve *Corbula gibba* was selected for population research to determine its ecological importance in the northern Adriatic ecosystem, due to the number of surviving individuals and profuse colonization in the early recovery period of the deserted benthos.

## 2. Material and methodology

For the population analysis of *Corbula gibba* (Olivi, 1792), bivalves were collected at the SJ-007 station (45° 17.0' N - 13° 16.0' E), from silty sand at 30 m depth, from February 1990 to December 1991 (Fig. 1). Bottom material was sampled with 0.4 m<sup>2</sup> of seabed surface by Van Veen grabbing (0.1 m<sup>2</sup>), sieved (2 mm sieve openings) and preserved in 4% neutralized formal until laboratory analysis.

In the laboratory, the closed shell *Corbulae* are separated from other macrofauna species. Numerous closed shell *Corbulae* were empty or filled with silt. Only live individuals were used for population analysis. The length of the shells of living individuals, i.e., the distance from the front to the rear edge of the shell, was measured with a movable scale (nonius). 15 samples were processed with a total of 5.973 *Corbulae*, of which 2.508 were alive and 3.465 with closed empty shells, and 17.809 specimens of other types of macrofauna. The number of live *Corbulae* per sample was recalculated to 1 m<sup>2</sup>.

## 3. Results and discussion

### 3.1 Population density

In the two years of research conducted at SJ-007 station, the monthly population density of *Corbula* ranged from 8 individuals/m<sup>2</sup> (September 1991) to 1.150 individuals/m<sup>2</sup> (July 1990), with a mean density of  $395 \pm 155.81$  individuals/m<sup>2</sup>. Differences in monthly population densities are attributed to the intensity of colonization and survival of individuals (Table 1). SJ-007 station is located north of the line connecting the mouth of the River Po and the city Rovinj (Fig. 1), in the zone where even during previous research dense *Corbulae* populations of more than 1.000 individuals/m<sup>2</sup> were recorded at several stations.



Table 1. Population density of *Corbula gibba*, according to the number of individuals per m<sup>2</sup> at SJ-007 station in 1990 and 1991

Date	No. individuals/m <sup>2</sup>	Date	No. individuals/m <sup>2</sup>
–	–	01/25/1991	88
02/26/1990	153	02/28/1991	168
03/29/1990	330	–	–
04/25/1990	398	04/02/1991	180
–	–	–	–
06/01/1990	975	–	–
07/05/1990	1150	–	–
08/15/1990	785	08/13/1991	35
09/13/1990	970	09/25/1991	8
10/16/1990	878	–	–
–	–	–	–
12/20/1990	128	12/17/1991	28
total: individuals/m <sup>2</sup> /year	5767		507

### 3.2 Colonization of newly recruited clams

After the mass mortality of macrofauna in November 1989, the colonization of *Corbula* at station SJ-007 was continuous, but of variable intensity. Newly recruited clams with a length of 2 mm were discovered in all months of 1990, and only rare individuals during 1991 (Fig. 2). It is assumed that the first recorded recruits in February and March 1990 were probably spawned at the end of 1989. The abundance of recruits in the new community in early 1990 followed successful spawning, larval development, survival in the plankton, and the colonization of mature larvae among the rare surviving species of predatory meiofauna and macrofauna. *Corbula* is an oviparous species with a large production of oocytes, external fertilization, and long development of larvae in the plankton, which enables the expansion of the distribution areal by means of sea currents. Therefore, the benthic community at SJ-007 station was most likely colonized by *Corbula* larvae brought by currents from adjacent zones, and in late spring and summer of 1990 by the seasonal, transversal surface current (River Po – Rovinj) (Fig. 1) from densely populated northern and western zones of the northern Adriatic.

Significant differences in the number of recruits in the years studied pointed to the high

potential of *Corbula* colonization in the early recruitment period of benthic communities. However, this potential decreased considerably in 1991, presumably due to the recovery of predator populations at the end of 1990. Due to rapid and profuse colonization after the oxygen crisis, the *Corbula* is considered an *opportunistic* species with a predominance of juvenile stages in near bottom post-hypoxic environments.

### 3.3 Growth and Life Cycle

During the spring of 1990, there was an intense growth of *Corbula*, characterized by a gradual shift of the peaks of the histogram from 2 mm in February 1990 to 6 mm of class length in June 1990 (Fig. 2), attributed to the regular spring bloom of phytoplankton, which *Corbula* uses as a *suspension feeding* species. In support of this, Boon & Duineveld state that polyunsaturated fatty acids of phytoplankton origin are important in the food chain of many benthic species. According to Bonvicini-Pagliai & Serpagli, the slowing of *Corbula* growth in summer and autumn of 1990 is linked to the summer cessation of *Corbula* shell growth due to autumn gametogenic activity. Boon et al. also highlighted the increased bacterial activity in the competition for food with macrofauna at higher summer temperatures.

Since December 1990, adult *Corbulae* have dominated in higher length classes with a gradual decrease in the total number of individuals by mid-1991 (Fig. 2). According to the population dynamics of growth of settled individuals after the mass mortality, the life cycle of *Corbula* would last between one and a half to two years. Aleffi et al. also cite the short life cycle of *Corbula* for the Gulf of Trieste.

### 3.4 Mortality rate

Thanks to its ability to tightly seal shells and switch to anaerobic metabolism, using biochemical protective mechanisms – *Corbula*, as a resident of unstable habitats, tolerates various environmental stress situations well.

Inter and intraspecies relations, as a competition for food and space, and especially predators, are important biotic regulators for populations of individual species within a particular benthic community. In the conducted research, the food competition caused the death of *Corbula* recruits up to 45%, only within the 2 mm class length in March 1990. As the recruits had transparent, closed, undamaged, and empty shells, the deaths were attributed to lack of food. However, the deaths of recruits due to starvation did not significantly disrupt the

gradual increase of the population towards the summer of 1990. At the same time, the competition for space between rare surviving benthic species and mature *Corbula* larvae was low, therefore giving ample room to *Corbula* larvae for mass colonization, good survival, and dominance over other types of macrofauna in the community until the end of 1990 (Fig. 2, 3).

Nevertheless, it seems that the population increase of *Corbula* by the end of summer 1990 is mainly due to the mass mortality of most predatory species in the autumn of 1989. During the 1990, the effect of predators was reduced to a minimum, so mature *Corbula* larvae descending to the bottom were not eliminated by the filtration activity of *suspension feeder* species, nor were settled recruits eliminated by predatory meiofauna and macrofauna species.

According to literature sources, the most dangerous predators of bivalves are starfish, in whose stomachs *Corbulae* were found. However, cases of throwing live adult *Corbulae* up after several days in the starfish's stomach were observed, which was not the case with juvenile stages. It is probable that repopulated predatory starfish eliminated a large part of small *Corbulae* in the autumn of 1990 (Fig. 2). Other possible predators are decapod crustaceans from the families Portunidae and Pilumnidae (Information provided by Z. Štević), fish from the family Sparidae, and flatfish (order Heterosomata) (Information provided by M. Kovačić). It is determined that during an oxygen crisis a significant number of predatory species suffer, and many fish leave vulnerable zones. Therefore, it took time to rebuild their populations or for adults to return to former benthic communities so that their predatory activity could come to the surface. Other less threatening predators are carnivorous gastropods of the families Muricidae and Naticidae. Live *Corbulae* with incompletely perforated shells were often sampled. According to literature sources, a special protective layer in the inner part of *Corbula*'s shell prevents the predator gastropod from penetrating the soft parts of the body, therefore giving *Corbulae* a better chance of survival, which is not the case with other bivalve species.

And finally, adult *Corbulae*, surviving the harmful effects of abiotic and biotic environmental factors, died of natural causes. The longest live *Corbula* specimen was measured 14.7 mm in February 1990. It survived hypoxia and would probably have died of natural causes soon had it not been sampled. According to Nordsieck and Poppe & Goto the maximum *Corbulae* lengths are 15 to 16 mm.

#### **4. Conclusion**

Two years of research into the population dynamics of *Corbula gibba*, after the

ecological disaster in 1989, expanded the previous knowledge about *Corbula* and confirmed its importance during the colonization of benthic communities of the northern Adriatic.

To summarize, *Corbula* is a small short-lived species, shallowly buried in silty sediments, and densely populated in unstable habitats with increased sedimentation and an abundance of organic matter. As a species resistant to oxygen shortage, *Corbula* survives hypoxic conditions in the near bottom layer well. After the mass mortality of numerous benthic species sensitive to oxygen shortages that occurred in the autumn of 1989, the high fertility of *Corbula* and its significant colonization into the benthic community became apparent the following year. In a damaged community, with the occurrence of low biodiversity, i.e., fewer macrofauna species, the competition for space is reduced which allows mature *Corbula* larvae and some other benthic species to massively colonize. In 1990, *Corbula*, as an opportunistic species, marked the beginning of a renewal for the stressed community with its intensive recruitment. Due to the dominance over other types of macrofauna and intensive filtration activity, *Corbula* becomes an important carrier of organic matter from phytoplankton to benthos, coinciding with the time of disappearance of many *suspension feeding* species in the near bottom layer. Since the end of 1990, the size of the *Corbula* population has decreased significantly, probably due to increased competition and predatory activity. In 1991, adult individuals prevailed, and with their gradual disappearance until the middle of 1991, the short life cycle of *Corbula* was confirmed.

#### *ACKNOWLEDGEMENT*

*I'd like to thank Dr. Andrej Jaklin for macrofauna data from the laboratory data bank. The work is supported by the Ministry of Science, Education and Sport of the Republic of Croatia (Project No. 00981302).*

## 2.3 Commentary and analysis

Considering this is a scientific genre, the most significant problem was the use of scientific terminology, for which it is extremely difficult to find the right English equivalent. Fortunately, the professors at the Ruđer Bošković Institute, Center for Marine Research, were kind enough to find time to clarify and help me with the translation. Finding the right equivalents for these terms is no easy task even for marine scientists, and since there is no universal Croatian-English dictionary for marine science, all scientists and researchers seek help and explanations in foreign literature.

The first problem I encountered while translating this text is *WE transversalna površinska struja* in the sentence *Prilikom jačih prodora slatkih voda, obogaćenih hranjivim solima, od ušća rijeke Po do istarske obale, putem WE transversalne površinske struje (Sl. 1), u proljeće i rano ljeto, značajno se povisuje primarna proizvodnja organske tvari s pojavom sluzavih tvorevina “cvjetanje mora” u cijelom vodenom stupcu.* After days of researching what this current might be called in English, I decided to contact prof. Andrej Jaklin from the Ruđer Bošković Institute, Center for Marine Research who is mentioned in the Acknowledgment section of the paper for help. Considering that prof. Jaklin is no physicist and has no extensive knowledge of sea currents, he gave me the contact of his colleague prof. Nastjenka Supić for further assistance. After more research, the Western Adriatic Current, which flows along the Italian coast and is heading south, caught my attention. Prof. Supić explained that the *WE transversalna struja*, on the other hand, flows from the mouth of the river Po towards east, i.e., from west to the east part of the northern Adriatic. Hence the name, *WE* – west-east. The name *transversalna* refers to the fact that it crosses from one side of the Adriatic to the other (it *moves transversely*). Considering that there is no accurate translation of this current into English, since there is no Croatian name for it, it was only logical to translate it descriptively. Texts (or in this case, names) for which no equivalent in the target language can be found are translated descriptively to fill the missing equivalent in the target language. This is an example of cases where minor extensions in the translation are allowed to accurately convey the meaning into the target language. By taking all of this into account, a fair translation reads as *the transversal current connecting the western and eastern part of the northern Adriatic*. Furthermore, it is important to note that this sentence is a bit too long in Croatian as well and should be divided into two segments. However, after closely examining the sentence, it is obvious that all segments of it are dependent on each other, so it was troublesome to divide it. As for the

translation of this sentence, two possible solutions were considered. The first solution used inversion, which allowed the sentence to be divided into two segments. This first solution was *The primary production of organic matter with the appearance of slimy algal bloom in the entire water column is significantly increased. This occurs in spring and early summer when stronger inflows of fresh water, enriched with nutrient salts, flow from the mouth of the River Po to the Istrian coast via the transversal current connecting the western and the eastern part of the northern Adriatic (Fig. 1)* This translation deviates significantly from the ST, but is semantically correct. Although it is a correct translation, after giving it a little thought, I came to another solution, which reads as follows: *In spring and early summer, during stronger inflows of fresh water (enriched with nutrient salts), from the mouth of the River Po to the Istrian coast via the transversal current connecting the western and the eastern part of the northern Adriatic (Fig. 1), the primary production of organic matter with the appearance of slimy algal bloom in the entire water column is significantly increased.* This second translation is much closer to the ST, so I decided to go with the second solution. To minimize the excessive use of commas, I opted for parenthesis to create smaller pauses while reading the sentence to preserve all necessary information and the natural spoken rhythm of the text.

Another problem concerned with terminology was the term *uz dno* in the sentence *Hipoksična stanja uz dno javljaju se u godinama poremećenih odnosa hidrometeoroloških prilika (snižena površinska slanost, povišena temperatura vode, dugotrajno razdoblje sunčanog i mirnog vremena, povišeni barometarski tlak, smanjeno vertikalno i horizontalno miješanje vode).* Although the literal translation for *dno* is *bottom*, and is used in texts connected to marine science, it is not suitable enough for such a scientific article. Another solution which was taken into consideration was *seabed*, which, according to the Merriam-Webster Dictionary, means the floor of a sea or ocean. It would be the appropriate solution for the term *dno*, but the text mentions not only the bottom of the sea, but also the area around the bottom (*uz dno*). Another solution was to translate it as *benthic zone*, which means relating to, or occurring at the bottom of a body of water – but after consulting prof. Jaklin regarding this matter, I was told that *the benthic zone* is primarily used for demersal<sup>2</sup> organisms and communities, and in that case a more effective solution would be *near the bottom layer* because that includes the entire animate and inanimate part of the sea floor.

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<sup>2</sup> *Demersal* – living near, deposited on, or sinking to the bottom of the sea (<https://www.merriam-webster.com/dictionary/demersal>)

Another term which posed a challenge in translation was *pomor* first mentioned in the sentence *Nakon pomora, pridnene zajednice osiromašene vrstama, s dovoljno slobodnog prostora za naseljavanje novaka, pružile su izvanrednu priliku za utvrđivanje reprodukcijskog potencijala, prvenstveno onih vrsta čije je naseljavnje uslijedilo odmah nakon krize kisika u pridnenom sloju vode*. Even though there is a translation for *pomor riba* – *fishkill*, it is not suitable in this case, because the text is about bivalve mollusks. Therefore, it was necessary to take other possible solutions into consideration, which were *plague* and *pestilence*, even though I was not satisfied with either of the two options. *Plague* was out of the question because, according to the Merriam-Webster Dictionary, it is tightly connected to diseases, which deviates from the meaning of the ST. *Pestilence*, on the other hand, first sounded as the right choice because it has the meaning of something that is destructive or pernicious, which in this case could be referring to oxygen shortage mentioned in the ST. However, using *pestilence* as equivalent for *pomor* still sounded unsuitable, so, after more researching, I found an article about deaths of freshwater mussels, and which would be the likeliest culprit<sup>3</sup> where the term *die-off* is mentioned. The term *die-off* means a sudden sharp decline of a population of animals or plants that is not caused directly by human activity. This solution seemed appropriate when considering the formality of the text and genre. After consulting prof. Jaklin, it was clarified that they [marine biologists] use *mass mortality* as translation for the term *pomor*, so I opted for that solution. Another term which posed a difficulty to translate from the same sentence is *naseljavanje novaka*. I did find that the author of the ST translated this as *newly recruited clams* in the Abstract section, but I wanted to make sure, so I contacted prof. Jaklin, and he confirmed that this is correct. The sentence was then translated as *After the mass mortality, species-depleted benthic communities, with enough free space to settle newly recruited clams, provided an extraordinary opportunity to determine the reproduction potential primarily of those species whose colonization occurred immediately after the oxygen crisis in the near bottom layer*.

Another scientific term which posed a difficulty to translate was the *polunezasićene masne kiseline fitoplanktonskog podrijetla*. After researching on the Internet, I found explanations only for *zasićene* and *nezasićene kiseline* (saturated and unsaturated acids), but there was no mention of *polunezasićene kiseline*. After consulting prof. Jaklin, I got in touch with prof. Mirjana Najdek from the Ruđer Bošković Institute, who specializes in fatty acids. She explained that this is, in fact, *a typo*, i.e., typographical error. The right spelling is

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<sup>3</sup> *Freshwater Mussels Are Dying—Which Is the Likeliest Culprit?*: <https://www.wired.com/story/freshwater-mussels-are-dying-which-is-the-likeliest-culprit/>

*polinezasićene kiseline*, and not *polunezasićene*. This kind of acids translate as *polyunsaturated fatty acids*, or shorter *PUFAs*. With this in mind, the sentence was translated as *In support of this, Boon & Duineveld state that polyunsaturated fatty acids of phytoplankton origin are important in the food chain of many benthic species*. This example shows how significant it is to always reconsider everything and check several times, especially when tackling a genre of which one has no extensive knowledge. It is of utmost importance for translators to consult themselves with experts to deliver an accurate translation and protect their integrity and status. In such cases where something is misspelled, the translator must consult him/herself with the client and inform them that the text was altered to be correct in the target language.

Even though this is a scientific genre, and it should contain the right technical terminology, the verb *izbacivanje* in the sentence *Međutim, zapaženi su slučajevi izbacivanja živih odraslih korbula nakon višednevnog boravka u želucu zvjezdača, što nije bio slučaj s juvenilnim stadijima* is an excellent example of how sometimes it is better to opt for simpler terms. Using the verb *to eject* would be too ambiguous in English, even though it is the right equivalent for *izbacivanje* in Croatian. According to the Merriam-Webster Dictionary, *to eject* means to throw out by physical force or to throw out or off from within. It does sound as if it could be used here, but this word choice is not in the spirit of the English language. While researching starfishes ejecting any kind of food, I came across many articles about starfishes ejecting their stomach from its own body to eat their prey. This was no new information to me, but it was neigh on impossible for me to find out anything about a starfish actually ejecting food, not their stomachs. After consulting prof. Jaklin, I was told that even though starfishes eject their stomachs to eat juvenile shellfish with soft shells, older shellfish can be difficult to digest because of their hard shell. The digestive enzymes of starfish are too weak to penetrate the hard shell, so they spit the undigested prey out. I was also instructed that it would be better to use a more colloquial word here and go with *throw up*, since that is precisely the verb marine scientists use within this context. After taking everything learned into account, I translated the sentence as *However, cases of throwing live adult Corbulae up after several days in the starfish's stomach were observed, which was not the case with juvenile stages*.

Another term I had to consult prof. Jaklin about was *korbuje s neprobušenim rupama* in the sentence *Naime, često su uzorkovane žive korbuje s neprobušenim rupama na ljušturama*. What firstly had to be done here is determine what exactly *neprobušene rupe* means. After researching on the Internet what this might mean, I came across the Carnegie



Museum of Natural History dictionary<sup>4</sup>, which mentioned *imperforated* meaning not having an opening, often referring to a shell umbilicus that is closed. An *umbilicus* is, according to the dictionary, the depression at the base of a snail shell, leading into the interior space of the columella<sup>5</sup>. This means that there are no openings on the shell, which can be of natural origin or inflicted by a predator. Prof. Jaklin explained that predatory snails puncture or perforate a mollusks shell to get to the soft tissue. Quite often, holes were seen that were the beginning of a snail's attack, but for some reason the 'drilling' was not completed, i.e., there was a partial hole (indentation) left on the outside of the shell. By taking these aspects into account, the proper translation is *Live Corbulae with incompletely perforated shells were often sampled*. The Croatian adverb *naime* was also omitted from the translation because the sentence is comprehensible without it and is more in the spirit of the English language.

Apart from the technical terminology closely related to marine biology for which I had to reach out to the professors from the Ruđer Bošković Institute, there were other terms which were understandable in Croatian, but had to be either altered a bit, or translated descriptively to concur with the English language.

An example thereof was the term *sluzavih tvorevina* in the sentence *Taloženjem i raspadom sluzavih masa na dnu nastaju hipoksična i čak anoksična stanja sa značajnim ugibajima pridnenih organizama osjetljivih na nestašice kisika*. Although the ST mentions *masa*, it is clear to Croatian readers that the author meant *matter*. Were it translated literally as *mass*, it could be puzzling to English readers since it is easy to confuse with mass in terms of weight. In order to avoid the translation being ambiguous, it was only *natural* to translate it as *matter*, which according to the Merriam-Webster Dictionary has the meaning of a material substance of a particular kind for a purpose which occupies space and has mass. With that in mind, the sentence was translated as *Slimy matter sedimentation and decomposition at the seabed produce hypoxic and even anoxic conditions with significant mortality of benthic organisms sensitive to oxygen shortages*.

The term *oka* in the sentence *Pridneni materijal je uzorkovan sa 0,4 m<sup>2</sup> površine dna Van Veenovim grabilom (0,1 m<sup>2</sup>) i prosijan kroz sita (2 mm oka), te sačuvan u 4% neutralnom formolu do obrade u laboratoriju* is straightforward in Croatian regarding the given context of the research paper, but had it been translated literally into English as *eye*, it would make no

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4 Carnegie Museum of Natural History: <https://www.carnegiemnh.org/science/mollusks/terminology.html>

5 The central, structural axis of a snail shell: <https://www.carnegiemnh.org/science/mollusks/terminology.html>

sense. After researching how to collect samples, I stumbled across the National Field Manual for the Collection of Water-Quality Data<sup>6</sup>. Under the section Sieves, *sieve openings* are mentioned, which is the equivalent to Croatian *oka* in this context. Apart from this, another problem I came across in this very sentence is *neutralni formol*. Since I am no scientist, it was crucial to understand what this solution is and what it is used for. After researching this solution, the only result I found was either *formalin* or *formaldehyde*. After trying to understand exactly what this solution does, I decided to consult prof. Jaklin. He explained that neutral formol (colloquially formalin) is a solution of (2 or 4%) formaldehyde in saltwater. Since it is used for the conservation of marine organisms, and is slightly acidified and dissolves lime structures, it is neutralized to pH 7 by adding borax to it. Prof. Jaklin meant that the best solution here would be to use *neutralized formol*, and not *neutral formol*. Taking all this into account, the sentence was translated as *Bottom material was sampled with 0.4 m<sup>2</sup> of seabed surface by Van Veen grabbing (0.1 m<sup>2</sup>), sieved (2 mm sieve openings) and preserved in 4% neutralized formol until laboratory analysis.*

When it comes to word choice, I had to thread carefully when translating *doći do izražaja* in the sentence *Prema tome, trebalo je vremena za obnovu njihovih populacija ili za povratak odraslih u ranije zajednice dna kako bi njihova predatorska aktivnost mogla ponovno doći do izražaja*. Even though this is very straightforward in Croatian, there are ways to translate it to better fit the spirit of the English language. Terms that first crossed my mind were either *to arise* or *to emerge* because both have the correct meaning when used in this sentence. However, in order to conform to the English language, one should use an idiom where possible – in this case, it was the idiom *come to the surface*. According to the Collins Dictionary, this idiom incorporates both the meaning of to emerge and to become apparent. Apart from the meaning, a part of this idiom is ‘surface’ which by itself is connected to the topic of the text – marine biology. The sentence was translated as *Therefore, it took time to rebuild their populations or for adults to return to former benthic communities so that their predatory activity could come to the surface.*

In order to make sure my translation reads clearly, some syntactic adjustments were necessary in several sentences. For example, the sentence *Usporenje rasta korbule u ljeto i jesen 1990. godine dovodi se u vezu, kako navode Bonvicini-Pagliai & Serpagli, s ljetnim*

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<sup>6</sup> National Field Manual for the Collection of Water-Quality Data:  
[https://pubs.usgs.gov/twri/twri9a8/twri9a8\\_Chap8final.pdf](https://pubs.usgs.gov/twri/twri9a8/twri9a8_Chap8final.pdf)

*prestankom rasta ljuštore korbule zbog jesenje gametogenetske aktivnosti, dok Boon i sur. ističu i povišenu bakterijsku aktivnost u kompeticiji za hranu s makrofaunom kod viših ljetnih temperature* is very long in Croatian, so it was necessary to divide it into at least two segments while translating it into English. When dividing a sentence, it is important to know which segments of the compound sentences are dependent on each other, and which can stand on their own. The conjunction *dok (while)* describes something that is happening at the same time as something else and in this case, connects two sentences which both can stand on their own. To avoid having such a long sentence in English, the conjunction *dok (while)* was omitted and a full stop was inserted. The adverb *also* was added to link the second sentence to the first. The sentence was then translated as *According to Bonvicini-Pagliai & Serpagli, the slowing of Corbular growth in summer and autumn of 1990 is linked to the summer cessation of Corbula shell growth due to autumn gametogenic activity. Boon et al. also highlighted the increased bacterial activity in the competition for food with macrofauna at higher summer temperatures.* Hence, the sentence is more comprehensive for the reader, and its meaning is preserved.

Such syntactic adjustments include the differences in punctuation. For example, in the sentence *Zbog brzog i obilnog naseljavanja, nakon krize kisikom, korbula se ubraja u "oportunističke" vrste s dominacijom juvenilnih stadija u pridnenim posthipoksičnim sredinama* the quotation marks were used incorrectly. Double quotation marks in Croatian are used for citations and to mark the beginning and end of a quote (it is necessary to provide a source of the citation), while single quotation marks are used for emphasis or to indicate an unusual use of a word. Since this is obviously no quote, double quotation marks cannot be used in the English translation. A better solution is to either use single quotation marks or to write the emphasized word in *italics*.

Another example of the importance of punctuation is in the sentence *Kako su novaci imali prozirne, zatvorene, neoštećene i prazne ljuštore, ugibanje se pripisuje manjku hrane.* When translated into English without any modifications, the sentence reads: *As the recruits had transparent, closed, undamaged and empty shells, the deaths were attributed to lack of food.* The punctuation missing here is an Oxford comma after *undamaged* and before the conjunctive *and*. The Oxford comma (also called serial comma or series comma) is a comma used before the final conjunction while listing three or more items.<sup>7</sup> It is mainly used for clarity, and it removes any potential ambiguity. Without the comma, the aforementioned sentence could be

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<sup>7</sup> *What is an Oxford comma?*: <https://www.oxford-royale.com/articles/oxford-comma/>

interpreted as the recruits having undamaged and empty shells at the same time, but in reality, the recruits could have had any of those modifications to their shells, and their deaths would still be attributed to lack of food. By adding the Oxford comma, it was evident that all those modifications can appear separately. Another aspect of the comma is that it replicates the spoken rhythm of the sentence and the short pauses between clauses, which improves the readability of the text.

### 3. Source text 2 – Introductory Remarks

The second source text is an original scientific paper titled *Tjelesne osobine sivog vuka (Canis lupus L.)* written by M. Platiša, I. Pintar, and J. Kusak, extracted from the *Veterinar* magazine. The text deals with veterinary science, more precisely with body measurements of gray wolves in Croatia and the differences in that respect between different age categories.

Similar to the first translated text in this thesis, this one also belongs to the domain of specialized translation. The text is concise, clear, and straight-forward. An in-depth knowledge of this topic is necessary to produce an accurate translation, as well as the usage of scientific dictionaries and glossaries. Apart from all the (online and paperback) resources available, it is advisable to consult the experts when translating such complex texts, which are abundant with technical terminology. The key to producing a precise translation lies in the translator's ability to understand who the end reader is, as well as how the text should be formulated.

Since the target audience for this text are scientists and scholars of veterinary science, it is imperative to use accurate technical terminology and word choice which corresponds to scientific papers. As Anna Romero states in her *Exploring veterinary science, a little-known translation specialization*:

*...veterinary specialization requires much more than simply choosing the right words in the target language. Not only must translators consider who their target audience will be in order to use the appropriate terminology and register, they must also constantly review the context, market trends, and regulatory documents affecting the sector in order to consistently take the best translation decisions and fulfil their customers' needs.*<sup>8</sup>

There can be no room for ambiguity, and that can be an arduous task, even for the most experienced translators.

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<sup>8</sup> Romero, Anna: *Exploring veterinary science, a little-known translation specialization* (2014)

## 3.1 SOURCE TEXT 2

IZVORNI ZNANSTVENI RAD

### Tjelesne osobine sivog vuka (*Canis lupus L.*)

Platiša, M.<sup>1</sup>, I. Pintar<sup>1</sup> i J. Kusak<sup>2</sup>

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#### Sažetak

*Svrha ovoga rada je dobivanje prosječnih vrijednosti tjelesnih mjera sivog vuka (*Canis lupus L.*) u Hrvatskoj s ciljem njihovog razlikovanja po pojedinim dobnim kategorijama. Na području Gorskog kotara, Like i Dalmacije sakupljana su tijelanađenih vukova stradalih od različitih uzroka. Mjereno je 23 tjelesnih parametara, a zbog spolnog dimorfizma kod mužjaka je mjereno 21 mjera, a kod ženki 20 mjera. Statističkom obradom tjelesnih mjera pokazano je da mužjaci za većinu mjera imaju veće vrijednost od ženki, to jest brže napreduju u rastu. Razlike između spolova postajusve očitije s porastom dobi životinja, da bi u odraslih jedinki bile najveće. Masa, kao jedan od pokazatelja tjelesne razvijenosti, najveća je u zimskom periodu i za mužjake i za ženke zbog veće dostupnosti plijena, dok u ostatku godine ostvaruje lagani pad.*

**Ključne riječi:** tjelesna mjera, *Canis lupus*, dimorfizam, spol

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#### Uvod

Morfometrija u biološkom smislu je znanstvena disciplina koja proučava tjelesne mjere određene životinjske vrste i nužan je preduvjet svakog istraživačkog i znanstvenog rada na toj vrsti. Kako je mjerenje tjelesnih mjera jedan od pristupa u opisivanju pojedine životinjske vrste i pomoć u određivanju dobi, naš se rad temelji na njihovoj analizi po dobnim kategorijama. Tjelesne mjere su karakteristične za određenu vrstui populaciju, uz veće ili manje varijacije (MITEVSKI, 1992.). Poznavanje morfologije sivog vuka važno je radi boljeg poznavanja njihove biologije, kakav utjecaj ima okoliš na nju, te da li i kako morfologija utječe na promjenu populaciji.

Sivi vuk (*Canis lupus*) je sisavac iz reda zvijeri (*Carnivora*), porodicepasa

(*Canidae*). Osim sivog vuka, poznate su još dvije slobodnoživuće vrste vukova – crveni vuk (*C. rufus*) i abesinijski (*C. simensis*). Sivi vuk zauzima ekološku nišu predatora velikih sisavaca sjeverne Zemljine polutke (ŠTRBENAC i sur., 2005.). Prema podacima koje su prikupili ROUTE i AYLSWORTH (1999.) brojnost sivog vuka u svijetu danas se procjenjuje na oko 150,000.

Početak 1990-ih populacija vukova u Hrvatskoj je obitavala samo u Gorskom kotaru i Lici, dok se vjerovalo da ih u Dalmaciji i nema (FRKOVIĆ i HUBER, 1992.). Od tada se broj vukova postupno povećavao zbog širenja vukova na nova područja te povećanja gustoće na područjima gdje su opstali. Godine 2001. vukovi su nastanjivali Gorski kotar, Liku i Dalmaciju, te se povremeno pojavljivali u peripanonskom prostoru, na južnim padinama Velebita, blizu Ravnih kotara, kod Kaštela, pa sve do Biokova (KUSAK, 2002.). Od 2008. godine Banovina i dio Karlovačke županije do Bosiljeva proglašeni su područjem stalne prisutnosti vuka (Izvešća o stanju populacije vuka, DESNICA i OKOVIĆ, 2007.).

Na temelju podataka sakupljenih do 2008. godine, procjenjuje se da se broj vukova u Hrvatskoj kreće u rasponu od 200 do 230 jedinki raspoređenih u 50-ak čopora (OKOVIĆ i DESNICA, 2008.).

Od donošenja Plana upravljanja vukom 2005., donesen je novi *Zakono zaštiti prirode*, u svibnju 2005., te izmjene i dopune Zakona u prosincu 2008. godine kao temeljni propis koji uređuje područje zaštite prirode u Republici Hrvatskoj (NN 70/05 i 139/08). Jedan od provedbenih propisa donesenih na temelju Zakona je *Pravilnik o proglašavanju divljih svojti zaštićenim i strogo zaštićenim* temeljem kojeg je vuk (*Canis lupus*) u Republici Hrvatskoj strogo zaštićena vrsta. Zakon propisuje da se strogo zaštićene divlje svojte ne smiju na bilo koji način koristiti (hvatati, držati, ubijati i sl.) ili uznemiravati (VUKŠIĆ, 2008.).

Cilj našeg rada bio je utvrđivanje prosječnih vrijednosti i razlikau tjelesnim osobinama unutar pojedinih dobnih kategorija, razlikovanje jedinki muškog i ženskog spola, analiza dinamike rasta jedinki u populaciji vukova u Hrvatskoj, postojanje sezonskih razlika u masi tijela vukova i duljini i širini testisa za mužjake.

Svrha rada bila je utvrđivanja tipičnih tjelesnih osobina vukova u Hrvatskoj te bi kao takav mogao pomoći u kasnijim istraživanjima razlika vukova od pasa i od njihovih međusobnih križanaca, što će doprinijeti u očuvanju vukova u Hrvatskoj. Križanci su nepoželjni s gledišta očuvanja populacije vukova (LINNELL i sur., 2007). Dobiveni rezultati doprinijeti će povećanju ukupne količine znanja o vukovima.

## Materijal i metode

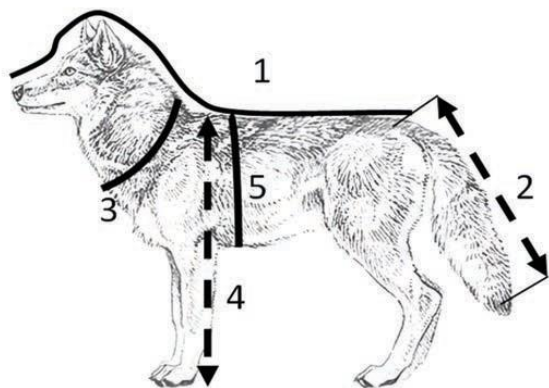
U razdoblju od 14.01.1996. do 23.11.2009. na području Gorskog kotara, Like i Dalmacije sakupljana su tijela nađenih mrtvih vukova stradalih od različitih uzroka (HUBER, 2002.). Izmjereno je ukupno 149 vukova. Mjerenja su obavljena na mrtvim vukovima prije njihove razudbe. Mjerene su 23 tjelesne mjere (Tablica 1), a zbog spolnog dimorfizma kod mužjaka je mjerena 21 mjera, te kod ženki 20 mjera. Međutim, stvarni broj promatranih mjera je veći, kako sespominje u daljnjem tekstu, zbog postojanja analognih mjera za parne dijelove tijela poput duljine lijeve i desne uške, širine prednje lijeve i desne šape i drugih.

Tablica 1: Opis tjelesnih mjera vukova mjerenih u ovom radu

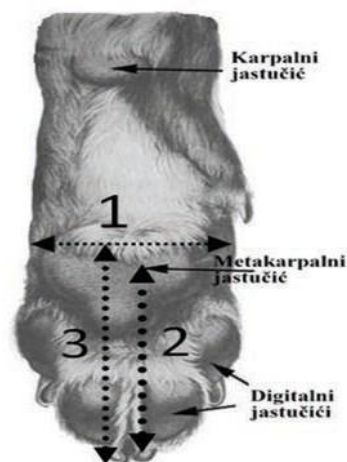
Tjelesna mjera	Opis
Duljina repa	Duljina od prvog repnog kralješka do kraja koštanog dijela repa, ne uključuje duljinu dlake
Duljina tijela bez repa	Duljina od vrha njuške do prvog repnog kralješka, po hrptu uz tijelo
Ukupna duljina tijela	Duljina od vrha njuške do kraja koštanog dijela repa, po hrptu uz tijelo, zbroj duljine tijela bez repa i duljine repa
Opseg glave	Obuhvaća najširi dio glave na kaudalnom dijelu jagodičnih lukova
Širina glave	Razmak između najširih točaka jagodičnih lukova
Duljina glave	Duljina od vrha nosa do stražnjeg ruba zatiljne kosti, po sredini glave
Udaljenost od oka do nosa	Udaljenost od unutarnjeg očnog kuta do vrha nosa, predstavlja duljinu njuške
Duljina očnjaka	Duljina od zubnog mesa do slobodnog vrha očnjaka
Razmak između očnjaka	Razmak između vrhova očnjaka, između gornjeg lijevog i desnog, te isto tako donjeg lijevog i desnog očnjaka
Duljina uške	Duljina od korijena uške s medijalnog ruba do vrha uške, ne uključujući dlaku
Udaljenost između uški	Udaljenost između medijalnih rubova uški kod njihovog korijena
Opseg vrata	Opseg koji obuhvaća najuže područje vrata
Opseg prsa	Obuhvaća trup vuka kaudalno od lopatica, preko najviše točke grebena, rebra i prsne kosti
Visina tijela	Visina mjerena od najviše točke grebena do jastučića stopala, kao da životinja stoji
Duljina šape bez pandže	Duljina od proksimalnog ruba metakarpalnih ili metatarzalnih jastučića do distalnog dijela prstiju
Duljina šape s pandžom	Duljina od proksimalnog ruba metakarpalnih ili metatarzalnih jastučića do vrha pandže
Duljina pandže	Udaljenost od početka vidljivog rožnatog dijela baze do vrha pandže
Širina šape	Udaljenost između lateralnog i medijalnog ruba šape u području metakarpalnih ili metatarzalnih jastučića
Bradavica promjer	Širina bradavice na bazi (uz kožu) obuhvaćena pomičnom mjerkom
Bradavica duljina	Duljina od baze do vrha bradavice
Os penis duljina	Duljina kosti penisa
Testis duljina	Duljina testisa u skrotalnoj vrećici po podužnoj osi
Testis širina	Širina testisa u skrotalnoj vrećici po poprečnoj osi



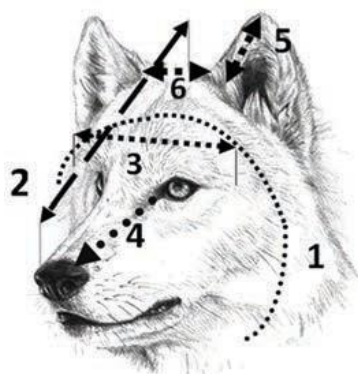
Masa je mjerena pomoću opružne vage koja mjeri do 50 kg i ima preciznost 0.5 kg, a dužinske mjere su uzimane mjernom vrpcom i pomičnom mjerkom. Sve dužinske mjere izražene su mjernom jedinicom centimetra (cm), masa u kilogramima (kg), te dob u godinama (god). Tjelesne mjere poput ukupne duljine tijela, opsega glave i vrata te visine tijela mjerene su mjernom vrpcom (Slika 1). Parametri na šapama i glavi, koji zahtijevaju preciznije mjerenje, određeni su pomičnom mjerkom (Slika 2, Slika 3).



Slika 1: Prikaz mjerenja tjelesnih mjera trupa vuka: 1. Duljina tijela bez repa, 2. Duljina repa, 3. Opseg vrata, 4. Visina tijela u grebenu, 5. Opseg prsa



Slika 2: Prikaz mjera šape vuka izmjenjenih u ovom radu: 1. Širina šape, 2. Duljina šape bez pandže, 3. Duljina šape s pandžom



Slika 3: Prikaz mjera glave vuka izmjenjenih u ovom radu: 1. Opseg glave, 2. Duljina glave, 3. Širina glave, 4. Udaljenost od oka do nosa, 5. Duljina uha, 6. Razmak između uški

Za obradu podataka vukovi su bili odvojeni po dobi u sedam kategorija. Dob vukova u ovom radu određivana je na temelju istrošenosti zubala (GIPSONi sur., 2000., MECH, 2006.), te na osnovu datuma nalaza tijela. Poznato je da je sezona tjeranja u siječnju i veljači, te štenci dolaze na svijet u periodu ožujka i početkom travnja (MECH, 1970.). Stoga se kod nalaza tijela, procjenjuje dob uzevši u obzir ožujak kao mjesec rođenja. U prvu dobnu kategoriju spadali su vukovi ustarosti od mjesec dana, u drugu dobnu kategoriju vukovi u starosti od dva do šest mjeseci, treća dobna kategorija bili su vukovi u dobi od šest do devet mjeseci,

četvrtoj dobnoj kategoriji pripadali su vukovi dobi od devet do dvanaest mjeseci, a peta dobna kategorija bili su vukovi u dobi od jedne do dvije godine. Šesta dobna kategorija bili su odrasli to jest stariji od dvije godine, koji su postigli spolnu zrelost (PETERSON, 1986.). Sedma kategorija bili su vukovi kojima se zbog određenog razloga nije mogla odrediti dob te su svrstani pod nepoznato.

Kao spremište podataka koristili smo bazu Microsoft Access, u koju smo sami upisali mjerene parametare. Njih smo zatim prebacili u Microsoft Excel i tablično ih prikazali. Statističku analizu vrijednosti radili smo pomoću programa "Statistica 7" (ANONIMUS, 2004.) te dobivene tablice i grafove doradili u Excelu, nakon čega smo ih uklopili u Word.

Usporedili smo neke od spolnih obilježja mužjaka, zavisno o godišnjim dobima, s pretpostavkom da pokazuju veće vrijednosti u sezoni parenja, to jest u zimskom razdoblju (MECH, 2006.).

Proveli smo analizu korelacije svih tjelesnih mjera sa dobi za sve jedinke prvih šest dobnih kategorija, te posebno za jedinke muškog i ženskog spola. Te smo vrijednosti usporedili s ciljem utvrđivanja razlika u rastu između dva spola. Sedmadobna kategorija nije uključena u ovu analizu zbog nepoznate dobi. Usporedili smo sve tjelesne mase odraslih vukova po godišnjim dobima s pretpostavkom da će imati veće vrijednosti u zimskom razdoblju (KUSAK, 2002.).

(...)

## Rasprava

Vukovi s područja Sjeverne Amerike gube na masi od proljeća do jeseni, a zimi i u rano proljeće ona ponovno dostiže veće vrijednosti. Razlog ovome je veća dostupnost plijena vukova (biljojeda) koje onda vukovi lakše love jer su oni, biljojedi, iscrpljeni nedostatkom hrane tijekom zime i ranog proljeća (MECH, 1970.). Promatrajući tjelesnu masu vukova iz Hrvatske, po godišnjim dobima, vidljivo je da mužjaci i ženke prate slična kretanja te da su ove vrijednosti veće u mužjaka (Slika 4.). Odsutnost značajnih sezonskih razlika u masi bilo mužjaka bilo ženki vukova iz dinarske populacije, može značiti da postoje i manje varijacije u uspješnosti hvatanja plijena vuka u istom području. Analiza kondicijskog stanja jelena i srna u Gorskom kotaru govori da plijen vuka ima značajno manji udio masti u koštanoj srži samo tijekom proljeća, tj. nakon zime (SPAJIĆ, 2009), ali izgleda da se to nije odražavalo značajno na promjenu mase vukova. Isti podaci nisu poznati za plijen vuka iz Like ili Dalmacije, odakle potječe dio mjerenih vukova. Nepoznato je postoje li varijacije u dostupnosti plijena i drugih

izvora hrane vukova (smetlišta, klaonički otpad) (KUSAK 2002.) ali ako i postoje, to se nije odražavalo na masu vukova tijekom godine. To je različito od spoznaja o vukovima iz drugih područja (MACNULTY, 2009.). Kostur vuka završava okoštavanje s dobi od godinu dana, ali još do dobi od dvije godine vukovi dobivaju na masi i postižu spolnu zrelost (MECH, 1970.). Naši rezultati pokazuju da tek u dobi nakon dvije godine se potpuno oforme razlike u spolovima kod vukova. One su najveće u odraslih jedinki, u dobi nakon dvije godine, a prisutne su u manjoj mjeri već i u vukova starosti od šest mjeseci do dvije godine (Slika 6.). Utvrđeni porast mase i duljine tijela s repom vukova, kao i većine tjelesnih mjera, bio je proporcionalan rastu i razvoju životinje tijekom života. To je u suglasju sa GILLESPIE i TURELLI (1989.) koji navode da okolišni čimbenici i genotip zajedno uvjetuju fenotip pojedine jedinke i razlog su varijabilnosti unutar populacije. Određivanjem korelacije tjelesnih mjera i dobi odvojeno za mužjake i ženke te njihovom usporedbom, utvrđeno je da je za 68,57 % mjera veća korelacija u mužjaka (Tablica 7). Za ženke je veća korelacija u odnosu na mužjake za jedanaest mjera. Na temelju ovih rezultata možemo zaključiti da mužjaci pokazuju veću korelaciju mjera s dobi, odnosno da napreduju u rastu brže od ženki, što je opet u skladu sa spoznajama o vukovima iz Sjeverne Amerike (MECH, 2006., GLUCKSMANN, 1974.). Dvije tjelesne mjere (4,3 %), pokazale su visoku pozitivnu korelaciju. To su bile duljina prednje najdulje pandže koja je bila izmjerena na tri jedinke, ( $r= 0,9$ ), te duljina lijevog testisa za tri jedinke, ( $r= 0,77$ ). Razlog ovako visokoj korelaciji ove tri mjere najvjerojatnije je mali broj jedinki za koje je ona poznata i vjerojatno je posljedica slučaja.

## Zaključci

1. Statističkom obradom tjelesnih mjera sedam dobnih kategorija vukova iz Hrvatske dokazano je da mužjaci za većinu tjelesnih mjera imaju veće vrijednosti od ženki. Razlike između spolova postaju sve očitije s porastom dobi životinja, da bi u odrasloj dobi bile najveće.
2. Usporedbom mase vukova s godišnjim dobima, vidljivo je da se masa mijenja ovisno o sezoni. Masa je najveća zimi i u proljeće. U razdoblju od proljeća prema jeseni masa vukova se postepeno smanjuje, a najmanja je u ljeto i jesen.
3. Primjećeno je da su duljina i širina testisa najveći u vukova izmjerenih zimi, u sezoni parenja.
4. Određivanjem korelacije svih poznatih tjelesnih mjera s dobi primjećena je u 82,9 % tjelesnih mjera laka do značajna pozitivna korelacija s dobi. Većina tjelesnih mjera raste

proporcionalno s dobi, iako njihova vrijednost uveliko ovisi i o okolišnim uvjetima poput dostupnosti plijena.

5. Broj razlika tjelesnih mjera između mužjaka i ženki povećava se s dobi. Kod sasvim mladih vukova nema razlika s obzirom na spol, ali kako vukovi rastu i broj razlika se povećava. Za 68,57 % mjera mužjaci pokazuju veću korelaciju s dobi, odnosno brže napreduju u rastu.

6. Mnoge od tjelesnih mjera, poput duljine i širine testisa u mužjaka, mijenjaju se ovisno o sezoni i godišnjem dobu što je vidljivo samo u odraslih jedinki.

## 3.2 Translation of source text 2

ORIGINAL SCIENTIFIC PAPER

### Physical features of the gray wolf (*Canis lupus* L.)

Platiša, M., I. Pintar and J. Kusak

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#### Abstract

*The objective of this paper is to obtain average values of body measurements of the gray wolf (*Canis lupus* L.) in Croatia with the aim of their differentiation by individual age categories. In the area of Gorski Kotar, Lika and Dalmatia, the bodies of wolves that died of various causes were collected. 23 body parameters were measured, and due to sexual dimorphism, 21 measurements were taken for males and 20 measurements for females. Statistical processing of body measurements has shown that males have a higher value for most measurements than females, i.e., they grow more rapidly. The differences between the sexes become more apparent as the animals in question age, to be the greatest [differences] in adults. Body mass, as one of the indicators of physical development, is the largest in the winter period for both males and females due to greater availability of prey, while during the rest of the year it [body mass] slightly declines.*

**Keywords:** body measurement, *Canis lupus*, dimorphism, sex

#### Introduction

Morphometry in biology is a scientific discipline that studies the body measurements of a certain animal species and is a prerequisite for any research and scientific paper on that species. Since taking body measurements is one of the approaches in describing a particular animal species and helping to determine age, this work is based on their [body measurements] analysis by age categories. Body measurements are characteristic for a certain species and population, with more or less variations (Mitevski, 1992). Knowledge of gray wolf morphology is important for a better understanding of their biology, what impact the environment has on them, and whether and how morphology affects changes in the

population.

The gray wolf (*Canis lupus*) is a mammal of the Order *Carnivora*, Family *Canidae*. In addition to the gray wolf, two other wild species of wolves are known – the red wolf (*C. rufus*) and the Ethiopian wolf (*C. simensis*). The gray wolf occupies the ecological niche of large mammalian predators of the northern hemisphere (Štrbenac et al., 2005). According to data collected by Route and Aylsworth (1999), the number of gray wolves in the world today is estimated at about 150,000.

In the early 1990s, the wolf population in Croatia inhabited only Gorski Kotar and Lika, while it was believed that none of them were present in Dalmatia (Frković and Huber, 1992). Since then, the number of wolves has gradually increased due to the extending to new territories and the increase in wolf population density in areas where they have survived. In 2001, wolves inhabited Gorski Kotar, Lika, and Dalmatia. They occasionally appeared in the peri-Pannonian area, on the southern hillside of Velebit, near Ravni kotari and Kaštela, all the way to Biokovo mountain (Kusak, 2002). Since 2008, the region Banovina and part of Karlovac County all the way to Bosiljevo were declared an area of permanent wolf presence (Reports on the state of the wolf population<sup>9</sup>, Desnica and Oković, 2007).

Based on data collected until 2008, it is estimated that the number of wolves in Croatia ranges from 200 to 230 individuals distributed in about 50 packs (Oković and Desnica, 2008).

Since the adoption of the Wolf Management Plan in Croatia 2005, a new *Nature Protection Act* was adopted in May 2005, while amendments to the Act were passed in December 2008.<sup>10</sup> It is the fundamental regulation governing the area of nature protection in the Republic of Croatia<sup>11</sup> (Official Gazette 70/05 and 139/08). One of the implementing regulations adopted based on the Act is the *Ordinance on the proclamation of protected and strictly protected wild taxa* pursuant to which the wolf (*Canis lupus*) is a strictly protected species in the Republic of Croatia.<sup>12</sup> The Act prescribes that strictly protected wild taxa must

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<sup>9</sup> Report on the state of the wolf population in Croatia in 2014:

[https://www.haop.hr/sites/default/files/uploads/dokumenti/03\\_prirodne/izvjesca/Report\\_on\\_the\\_state\\_of\\_the\\_wolf\\_population\\_in%20Croatia\\_in\\_2014.pdf](https://www.haop.hr/sites/default/files/uploads/dokumenti/03_prirodne/izvjesca/Report_on_the_state_of_the_wolf_population_in%20Croatia_in_2014.pdf)

<sup>10</sup> Extracted from the *Nature Protection Act 318*: <http://www.life-vuk.hr/eng/regulations-and-documents/national-regulations/nature-protection-act-318.html>

<sup>11</sup> Extracted from the *Nature Protection Act 318*: <http://www.life-vuk.hr/eng/regulations-and-documents/national-regulations/nature-protection-act-318.html>

<sup>12</sup> Extracted from the *Ordinance on the proclamation of protected and strictly protected wild taxa*: <http://www.life-vuk.hr/eng/regulations-and-documents/national-regulations/ordinance-on-the-proclamation-of-protected-and-strictly-protected-wild-taxa-319.html>

not be exploited in any way (captured, kept, killed, etc.) or disturbed<sup>13</sup> (Vukšić, 2008).

The aim of this paper was to determine the average values and differences in physical features of wolves within particular age categories, to differentiate between male and female individuals, to analyze the dynamics of individual growth in the wolf population in Croatia, to determine the existence of seasonal differences in the body mass of wolves and the length and width of the testicles in males.

The objective of the paper was to determine the typical physical features of wolves in Croatia. As such it could help in later research of differences between wolves from dogs and their crossbreeds, which will contribute to the preservation of wolves in Croatia. Crossbreeds are undesirable from the point of view of preserving the wolf population (Linnell et al., 2007). The results obtained will contribute to the increase of knowledge base about wolves.

## Material and Scientific Methods

In the period from Jan 14<sup>th</sup>, 1996, to Nov 23<sup>rd</sup>, 2009, bodies of wolves that died of various causes were collected in the area of Gorski Kotar, Lika, and Dalmatia (Huber, 2002). Measurements were taken on a total of 149 dead wolves before performing necropsy. 23 body measurements were taken (Table 1) — 21 measurements in males due to sexual dimorphism, and 20 [measurements] in females. However, the actual number of observed measurements is higher, as mentioned below, due to the existence of analogous measurements for the even parts of the body such as the length of the left and right ear, the width of the front left and right paws and the like.

Table 1: Description of body measurements of wolves taken in this paper

Physical Measurement	Description
Tail length	The length from the first tail vertebra to the end of the tail bone (not including the length of hair)
Body length without tail	Length from the tip of the muzzle to the first tail vertebra (measured along the backbone)

<sup>13</sup> Extracted from the *Ordinance on the proclamation of protected and strictly protected wild taxa*: <http://www.life-vuk.hr/eng/regulations-and-documents/national-regulations/ordinance-on-the-proclamation-of-protected-and-strictly-protected-wild-taxa-319.html>

Full body length	Length from the tip of the muzzle to the end of the tail bone (measured along the backbone); sum of body length without tail and tail length
Head girth	Includes the widest part of the head on the caudal part of the zygomatic arches
Head width	Distance between the widest points of zygomatic arches
Head length	Length from the tip of the nose to the rear edge of the neck bones (measured along the middle of the head)
Distance from eye to nose	Distance from the inner canthus to the tip of the nose; represents the muzzle's length
Canine length	Length from the gum to the free tip of the canine
Intercanine distance	Distance between the tips of the canines –between the upper left and right, as well as the lower left and right canines
Ear length	Length from the medial base of the ear to the apex (not including the ear fur)
Distance between the ears	Distance between the medial borders at the base of the ear
Neck girth	Circumference of the narrowest part of neck
Chest girth	Encompasses the body caudal from the scapulae, across the highest point of the withers, ribs, and sternum
Body height	Height measured from the highest point of the withers to the paw pads, as if the animal was standing
Paw length without the claw	Length from the proximal edge of the metacarpal or metatarsal pads to the distal part of digital pads
Paw length with the claw	Length from the proximal edge of the metacarpal or metatarsal pads to the tip of the claw
Claw length	Distance from the visible horny base to the tip of the claw
Paw width	Distance between the lateral and medial edge of the paw (in the area of the metacarpal or metatarsal pads)
Nipple diameter	The width of the nipple at the base (measured along the skin with a caliper)



Nipple length	Length from the base to the tip of the nipple
Os penis length	Length of the penile bone (os penis)
Testicle length	Testicle length (in scrotum) along the longitudinal axis
Testicle width	Testicle width (in scrotum) along the transverse axis

The body mass was measured using a spring scale that measures up to 50 kg and has an accuracy of 0.5 kg, and the length measurements were taken with a measuring tape and a caliper. All length measurements are expressed in centimeters (cm), mass in kilograms (kg), and age in years (yr.). Body measurements such as full body length, head and neck girth, and body height were measured with a measuring tape (Figure 1). The paws and head parameters, which require more precise measurement, are determined by a caliper (Figure 2, Figure 3).

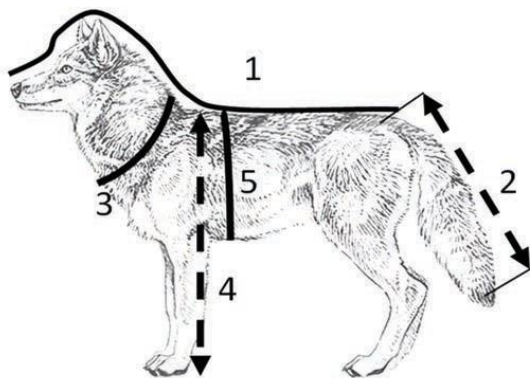


Figure 1: Body measurements: 1. Body length without tail, 2. Tail length, 3. Neck girth, 4. Height of the withers, 5. Chest girth

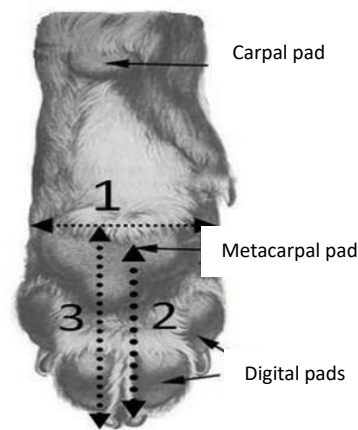


Figure 2: Paw measurements: 1. Paw width, 2. Paw length without claw, 3. Paw length with claw

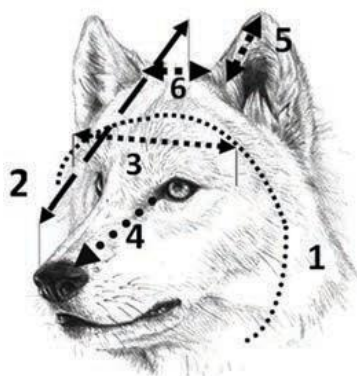


Figure 3: Head measurements: 1. Head girth, 2. Head length, 3. Head width, 4. Distance from eye to nose, 5. Ear length, 6. Distance between the ears

For data processing, wolves were divided by age into seven categories. The age of the wolves in this paper was determined based on tooth wear (Gipson et al., 2000, Mech, 2006), and based on the date the body was found. It is known that the breeding season is in January

and February, and pups are born during March and early April (Mech, 1970). Hence, the age of the found bodies is estimated by assuming that March is their month of birth. The first age category included wolves at the age of one month, the second category included wolves aged two to six months, the third category included wolves aged six to nine months, the fourth category included wolves aged nine to twelve months, and the fifth category included wolves aged one to two years. The sixth age category included wolves older than two years (adults), who reached sexual maturity (Peterson, 1986). The seventh age category included wolves whose age could not be determined for some reason and were classified as unknown.

As a data repository, the Microsoft Access database was used, in which the measured parameters were entered by hand. The parameters were then transferred to Microsoft Excel and then tabulated. The statistical analysis of values was done using the program “Statistica 7” (Anonymous, 2004) and the obtained tables and graphs were refined in Microsoft Excel, after which they were incorporated into Microsoft Word.

Depending on the seasons, some of characteristics of the sexual behavior of males were compared in this research, with the assumption that these characteristics indicate higher values during the breeding season, i.e., in the winter period (Mech, 2006).

An analysis of the correlation of all body measurements with age for all individuals of the first six age categories was conducted, and separately for males and females. These values were compared to determine the differences in growth between the two sexes. The seventh age category is not included in this analysis due to unknown age of specimens. All body masses of adult wolves were compared by season with the assumption that they will have higher values in the winter period (Kusak, 2002).

(...)

## **Discussion**

North American wolves lose body mass from spring to autumn and gain it again in winter and early spring. The reason for this gain in body mass is the greater availability of prey for wolves (herbivores). Wolves hunt herbivores more easily in winter because the herbivores are exhausted from lack of food during winter and early spring (Mech, 1970). By observing seasonal body mass variation of wolves in Croatia, it is evident that males and females have similar movement patterns, with higher body mass values observed in males (Figure 4). The absence of significant seasonal differences in the body mass of either male or female wolves from the Dinaric population could also mean that minor variations in the incidence of obtaining prey in the same area are present. The analysis of body condition of deer and does in Gorski Kotar shows that prey has a significantly lower fat content in the

bone marrow only during the spring, i.e., after the winter (Spajić, 2009). However, it seems that this did not significantly affect the change in the body mass of wolves. The same data for the prey of wolves from Lika or Dalmatia, from where a part of the measured wolves originated, is unknown. It is unknown whether there are variations in the availability of prey and other food sources (dumps, slaughterhouse waste) (Kusak, 2002). If those variations do exist, they were not reflected in the body mass of wolves during the year. This differs from the information available on wolves from other areas (Macnulty, 2009).

The ossification of wolf skeletons is complete at the age of one, but the wolves gain body mass and reach sexual maturity by the age of two (Mech, 1970). Our results show that it is only after the age of two that the gender differences in wolves are fully formed. The differences are largest in adult specimens (older than two years) and are present to a lesser extent already in wolves aged from six months to two years (Figure 6).

The determined increase in body mass and length including the tail of wolves, as well as most body measurements, was proportional to the growth and development of the animal during its lifetime. This is in accordance with Gillespie and Turelli (1989) who state that environmental factors and genotype condition the phenotype of an individual and are the reason for variability within the population.

By defining the correlation of body measurements and age separately for males and females and comparing them, it was determined that the correlation in males is 68.57% higher (Table 7). In females, the correlation of body measurements and age is higher compared to males by eleven measurements. Based on these results, we can conclude that males show a higher correlation of measurements with age. They grow faster than females, which is again in line with the knowledge about North American wolves (Mech, 2006, Glucksmann, 1974). Two body measurements (4.3%) showed a high positive correlation. These measurements were the length of the anterior longest claw measured in three individuals, ( $r= 0.9$ ), and the length of the left testicle in three individuals, ( $r= 0.77$ ). The reason for such a high correlation between these three measurements can be observed in the small number of individuals for which they were taken and is probably coincidental.

## Conclusions

1. Statistical analysis of body measurements for seven age categories of Croatian wolves has shown that males have higher values for most body measurements than females. The differences between the sexes become more and more apparent with the increase

in the age of animals and are largest in adulthood.

2. By comparing the body mass of wolves with the seasons, it is evident that it changes depending on the season. The body mass is highest in winter and in spring. The body mass of wolves gradually decreases from spring to autumn and is the smallest in summer and autumn.
3. It was observed that the length and width of the testicles are the largest in winter, during the breeding season.
4. By determining the correlation of all known body measurements with age, 82.9% of body measurements presented low to significant positive correlation with age. Most body measurements increase in proportion to age, although their value also depends on environmental conditions such as the availability of prey.
5. The number of differences in body measurements between males and females increases with age. There are no gender differences in very young wolves, but as they grow, the number of differences increases. Males show a higher correlation with age in 68.57% of body measurements, i.e., they grow faster.
6. Many of the body measurements, such as the length and width of the testicles in males, change depending on the season, which are visible only in adult specimens.

### 3.3 Commentary and analysis

The first problem I encountered while translating this scientific text is the term *osobine* first mentioned in the title of the text. This term can be translated into the English language either as *characteristic* or *feature*. Although these two terms can be used interchangeably in some contexts, after a quick search in the Merriam-Webster Dictionary, it was evident that their meanings slightly differentiate when referring to physical attributes. A *characteristic* generally refers to a broader quality or trait that can be used to describe something in a more general sense. These qualities involve multiple features and are typically more difficult to define or measure. The term *feature*, however, refers to a distinctive aspect or part of something which can be measured or observed. Such traits can easily be identified and described. Considering that the topic of the text are measurements of certain wolves' body parts, it was evident that *feature* would be the accurate translation. In addition to that, it is essential to note that in scientific papers a clear and concise language without ambiguities should be maintained.

While translating the Abstract section of the text, I had to insert either *which* or *that* into the sentence *Na području Gorskog kotara, Like i Dalmacije sakupljana su tijela nađenih vukova stradalih od različitih uzroka.* to introduce the phrase *stradalih od različitih uzroka*. To most foreigners, these two relative pronouns are interchangeable in almost every sentence, however, the difference between these two is a matter of restrictive and non-restrictive clauses. *Which* introduces a non-restrictive clause, i.e., the information that follows this relative pronoun is not essential to the sentence's meaning but provides additional information.<sup>14</sup> On the other hand, *that* introduces a restrictive clause, i.e., new information essential to the meaning of the sentence. By removing the restrictive clause, the intended meaning of the entire sentence would be changed.<sup>15</sup> After taking all this information into account, it was clear that the clause *stradalih od različitih uzroka* was restrictive, so, to conform to the English language, the relative pronoun *that* had to be used here. The sentence was then translated as *In the area of Gorski Kotar, Lika and Dalmatia, the bodies of wolves that died of various causes were collected.*

Another challenge I faced while translating this text was *slobodnoživuć* in the sentence *Osim sivog vuka, poznate su još dvije slobodnoživuće vrste vukova – crveni vuk (*C. rufus*) i abesinijski (*C. simensis*). At first, I translated the term literally as *free-living*, and a quick search on the Internet confirmed that this is commonly used when referring to organisms/animals*

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<sup>14</sup> "That" vs. "Which": When Do You Use Each? <https://www.dictionary.com/e/that-vs-which/>

<sup>15</sup> "That" vs. "Which": When Do You Use Each? <https://www.dictionary.com/e/that-vs-which/>

living in the wild. However, what gave me pause for thought is the explanation I found in the Merriam-Webster Dictionary. According to the Merriam-Webster Dictionary, free-living means being metabolically independent – neither parasitic nor symbiotic, which conveys a different meaning from the one provided in the ST and describes an organism not directly dependent on another for survival. Since wolves are dependent on their prey for survival, using *free-living* in this context was inaccurate. After reconsidering this matter, I realized that the correct English equivalent is *wild*. According to the Merriam-Webster Dictionary, the term *wild* is defined as living in a state of nature and not being tame or domesticated. After establishing the correct equivalent for the Croatian adjective *slobodnoživuć*, the correct English translation for the different wolf species had to be determined. Names of certain species often vary across languages, so it is imperative to research by their Latin taxonomy. According to Animal Diversity Web, *crveni vuk* (*C. rufus*) is translated into the English language literally as *red wolf*, which is not the case with *abesinijski vuk* (*C. simensis*) – which is translated as *Ethiopian wolf*, but also called *Simian jackal* and *Simien fox*. After I had determined the correct solutions for these translatorial issues, I translated the sentence as *In addition to the gray wolf, two other wild species of wolves are known – the red wolf (C. rufus) and the Ethiopian wolf (C. simensis).*

Additionally, to ensure a high-quality translation, I opted for the impersonal voice – a typical feature of scientific English writing which promotes objectivity. So I translated the sentence *Cilj našeg rada bio je utvrđivanje prosječnih vrijednosti i razlika u tjelesnim osobinama unutar pojedinih dobnih kategorija, razlikovanje jedinki muškog i ženskog spola, analiza dinamike rasta jedinki u populaciji vukova u Hrvatskoj, postojanje sezonskih razlika u masi tijela vukova i duljini i širini testisa za mužjake.* as *The aim of this paper was to determine the average values and differences in physical features of wolves within particular age categories, to differentiate between male and female individuals, to analyze the dynamics of individual growth in the wolf population in Croatia, to determine the existence of seasonal differences in the body mass of wolves and the length and width of the testicles in males.* The same example can be observed in the sentence *Njih smo zatim prebacili u Microsoft Excel i tablično ih prikazali.* which was translated as *The parameters were then transferred to Microsoft Excel and then tabulated.*

Apart from using the impersonal voice, I decided to split certain sentences into shorter ones. The Croatian language is well-known for lengthy and complicated sentences, whereas the English language is recognized by its concise and clear expressions. An example thereof is the sentence *Svrha rada bila je utvrđivanja tipičnih tjelesnih osobina vukova u Hrvatskoj te bi kao*

*takav mogao pomoći u kasnijim istraživanjima razlika vukova od pasa i od njihovih međusobnih križanaca, što će doprinijeti u očuvanju vukova u Hrvatskoj.* which I translated as *The objective of the paper was to determine the typical physical features of wolves in Croatia. As such it could help in later research of differences between wolves from dogs and their crossbreeds, which will contribute to the preservation of wolves in Croatia.*

Contrary to that, it was required to combine some sentences to avoid unnecessary repetition. The sentences in question are *Izmjereno je ukupno 149 vukova.* and *Mjerenja su obavljena na mrtvim vukovima prije njihove razudbe.* Since both sentences contain the verb *mjeriti* (*measure*) they can be combined into one sentence by introducing the conjunction *and*. This way, unnecessary words can be omitted, and the final translation is less repetitive and more concise.<sup>16</sup> Apart from combining the sentences, I had to determine the meaning of the Croatian word *razudba*. According to *Hrvatski jezični portal*, *razudba* is an obsolete medical term for *obdukcija*. Here, I almost fell into a trap because the English equivalent for *obdukcija* is *autopsy*, but *autopsy* is used when performing a postmortem on human beings. The appropriate term for an animal's autopsy is *necropsy*.<sup>17</sup> Taking that into consideration, the final translation of these sentences is *Measurements were taken on a total of 149 dead wolves before performing necropsy.*

Another example where the verb *mjeriti* (*measure*) posed a syntactical challenge was in the sentence *Mjerenje su 23 tjelesne mjere (Tablica 1), a zbog spolnog dimorfizma kod mužjaka je mjerena 21 mjera, te kod ženki 20 mjera.* To avoid the repetition of the verb *measure*, I opted for an *em dash* (–). The *em dash* functions like a comma, a colon, or parenthesis, and provides additional information to a sentence. It introduces a clause that expands upon something that precedes it.<sup>18</sup> The *em dash* also serves here to indicate a verbal pause, which allows the reader to focus on the given information. Apart from the *em dash*, I also repeated the subject in the second part of the sentence to improve the readability of the text. After refining the sentence, it was translated as *23 body measurements were taken (Table 1) — 21 measurements in males due to sexual dimorphism, and 20 [measurements] in females.*

Another sentence which used the verb *mjeriti* (*measure*) that needed to be altered to sound more in the spirit of the English language is *Kako je mjerenje tjelesnih mjera jedan od*

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<sup>16</sup> *Rules for Combining Sentences*: <https://grammar.yourdictionary.com/sentences/rules-for-combining-sentences.html>

<sup>17</sup> *What is a Necropsy?*: <https://vetmedaz.com/what-is-a-necropsy/>

<sup>18</sup> *Merriam Webster Dictionary: A Guide to Em Dashes, En Dashes, and Hyphens*: <https://www.merriam-webster.com/words-at-play/em-dash-en-dash-how-to-use>

*pristupa u opisivanju pojedine životinjske vrste i pomoć u određivanju dobi, naš se rad temelji na njihovoj analizi po dobnim kategorijama.* Since *mjerenje* is translated as *measuring*, and *tjelesne mjere* as *body measurements*, I had to modify the phrase to avoid repetition. If I translated it as *measuring body measurements* it would sound awkward and inaccurate, so I had to research the verb most commonly used with the noun *measurement* – which is *to take*. The verb *to take* can be used without the noun *measurement* and still convey the same intended meaning. So the sentence was then translated as *Since taking body measurements is one of the approaches in describing a particular animal species and helping to determine age, this work is based on their [body measurements] analysis by age categories.* Another adjustment I had to make in this sentence is repeat the subject *body measurements* to improve the readability of the sentence. Without repeating the subject, it would be unclear what the second part of the sentence is referring to, so I added the subject into square brackets to provide context for the reader and define the pronoun *their*.

In some sentences, certain words had to be omitted to retain the conciseness and formality of the specialized texts. An example thereof is in the sentence *Šesta dobnja kategorija bili su odrasli to jest stariji od dvije godine, koji su postigli spolnu zrelost* (PETERSON, 1986.). A possible translation of this sentence was *The sixth age category included adult wolves, i.e., those older than two years, who reached sexual maturity* (Peterson, 1986). Although this is translated correctly, I highlighted it in the translation to come back to it and reconsider it. After a day or two, upon further reflection, I came to another shorter solution where I inserted the term *adult* into the sentence in brackets. This way, the intended meaning was retained in the *compressed* version of the sentence and formulated as *The sixth age category included wolves older than two years (adults), who reached sexual maturity* (Peterson, 1986).

The most time-consuming challenge I faced translating this text was finding the correct English equivalents for the abundance of technical (veterinary) terminology. The first example thereof is the term *greben* in the sentence *Visina mjerena od najviše točke grebena do jastučića stopala, kao da životinja stoji.* Given that the Croatian term *greben* is primarily associated with reefs, it was necessary to investigate its meaning in the context of wolves and veterinary science. After researching on the Internet, I discovered that the English translation is *withers*. *Withers* is a band of muscles which can be measured to determine the height of horses or dogs (including wolves).<sup>19</sup> After clearing this problem up, I translated the sentence as *Height measured from the*

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<sup>19</sup> *What Are Withers On A Dog And How To Properly Measure?:* <https://dogadvisorycouncil.com/what-are-withers-on-a-dog/>



*highest point of the withers to the paw pads, as if the animal was standing.* Another term I had to research to find the technical equivalent was *vrh uške* mentioned in the sentence *Duljina od korijena uške s medijalnog ruba do vrha uške, ne uključujući dlaku.* The first solution that crossed my mind was *tip of the ear*, but I realized that it sounded overly colloquial to suit the scientific style of this source text. After researching the anatomy of the canine ear, I determined that the correct English equivalent was *apex*<sup>20</sup>, which, according to the Merriam-Webster Dictionary, is Latin for the narrowed or pointed end (tip). The *korijen uške s medijalnog ruba* was translated as *medial base of the ear* to contribute to the easier readability of the text. The full sentence was then translated as *Length from the medial base of the ear to the apex (not including the ear fur).*

While translating this text, I realized that one paragraph had an official English translation available *online*. The paragraph in question is *Od donošenja Plana upravljanja vukom 2005., donesen je novi Zakon o zaštiti prirode, u svibnju 2005., te izmjene i dopune Zakona u prosincu 2008. godine kao temeljni propis koji uređuje područje zaštite prirode u Republici Hrvatskoj (NN 70/05 i 139/08). Jedan od provedbenih propisa donesenih na temelju Zakona je Pravilnik o proglašavanju divljih svojti zaštićenim i strogo zaštićenim temeljem kojeg je vuk (Canis lupus) u Republici Hrvatskoj strogo zaštićena vrsta. Zakon propisuje da se strogo zaštićene divlje svojte ne smiju na bilo koji način koristiti (hvatati, držati, ubijati i sl.) ili uznemiravati (VUKŠIĆ, 2008.).* After conducting an *online* search, I found the *Nature Protection Act* and *Ordinance on the proclamation of protected and strictly protected wild taxa* from the Croatian State Institute for Nature Protection which provided the exact same sentences used in this source text. Since most national regulations are officially translated into the English language, rather than translating them again, I extracted them from the official English site of the same regulation. Additionally, I had to cite the source from which the sentences were extracted (either within the text or as a footnote), as this was not done in the source text. Failure to provide proper citations would constitute plagiarism, and it would imply that I translated the sentences myself. In academic writing, it is imperative to acknowledge and give proper credit to all sources of information.

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<sup>20</sup> *Anatomy of the Canine and Feline Ear*: <https://veteriankey.com/anatomy-of-the-canine-and-feline-ear/>

#### 4. Source text 3 – Introductory Remarks

The third source text is the interview titled *Spirala je srž* written by Marina Tkalčić and Suzana Marjanić extracted from the biweekly *Zarez*. The interviewees are Nadežda Elezović, Neva Lukić and Ksenija Orelj – the curators of the art exhibition *The Seventh Heaven* held in the Museum of Modern and Contemporary Art in Rijeka. The interview consists of a series of questions and answers, all closely connected to the theme of the exhibition – the symbol of the spiral and the circle. The interview also showcases how the curators came to the idea of the exhibition and the significance the exhibition has for them.

It is crucial to understand who the interview is meant for. Due to the fact that the target audience are non-professionals, i.e., *general public*, the style is very informal, and the text full of colloquialisms. To ensure the accuracy of the translation, it is necessary to research the correct equivalents of idiomatic expressions and colloquialisms used, while also conforming to the target language. When translating interviews, there are certain questions that must be considered to produce a quality translation, as B. Filep states in his paper *Interview and translation strategies: coping with multilingual settings and data*:

- *Which is a better translation strategy, literal or non-literal translation?*
- *What about translating words or phrases that may exist in one language but do not have an exact equivalent in another?*
- *What meanings and messages do words and phrases carry in one cultural context and not in another?*<sup>21</sup>

It was my initial presumption that this text, which contains the fewest technical terms, would be the least time-consuming to translate. However, this interview presented a number of difficulties and challenges mainly connected to the word choice and finding suitable colloquialisms in the target language.

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<sup>21</sup> Filep, B.: *Interview and translation strategies: coping with multilingual settings and data* (2009) - <http://www.soc-geogr.net/4/59/2009/sg-4-59-2009.pdf>

## 4.1 SOURCE TEXT 3

### **Nadežda Elezović, Neva Lukić i Ksenija Orelj - Spirala je srž**

Razgovor s kustosicama izložbe *Sedmo nebo* (MMSU, Rijeka, 14.7.-14.8.2016.)

*Kako je nastala ideja izložbe Sedmo nebo, koja u svojoj srži obuhvaća spiralu/spiralnost i krug, te formiranjem kustoskog kolektiva koji i činite? Također, kako ste "dramaturški" prostorno koncipirale sam postav u odnosu na značenja samih radova?*

N.E... Zajedništvo bi bio prikladniji termin od kolektiva. Riječ je o zajedničkom radu, kako nas tri kustosice, tako i o suradnji Muzeja moderne i suvremene umjetnosti s Astronomskim centrom Rijeka. Također, izložba je kroz bavljenje formom kruga ponudila zajedništvo vizualne umjetnosti, znanosti te duhovnosti. Riječ je o izložbi koja u zajedništvo okuplja 30-ak djela iz fundusa Muzeja te u jedinstvu prikazuje stvaralaštvo 28 umjetnika/ica: Getulio Alviani, Vojin Bakić, Petar Brajnović, Tomislav Brajnović, Boris Cvjetanović, Boris Demur, Mirjana Đorđević, Eugen Feller, Aleksandar Garbin, Sanja Iveković, Željko Kipke, Julije Knifer, Ivan Kožarić, Ante Kuduz, Zlatko Kutnjak, Dalibor Martinis, Dan Oki, Ivan Picelj, Otto Piene, Božidar Rašica, Vjenceslav Richter, Lucio Saffaro, Aleksandar Srnec, Melita Sorola Staničić, Damir Stojnić, Jasna Šikanja, Miroslav Šutej i Predrag Todorović.

Nasuprot linearnom vremenskom slijedu i linearno-vremenskom postavu djela nastalih unatrag posljednjih šezdesetak godina, odnosno nasuprot promišljanja o umjetnosti unutar dekada, pri radu na postavu izložbe radije smo osluškivale unutarnji ritam odabranih radova i međusobnu komunikaciju tih djela. Krug, kao najstariji simbol u povijesti čovječanstva, označava jedinstvo, harmoniju, cjelovitost. Ta smo načela pokušale integrirati i u postav izložbe. Stoga su i nastale neke zanimljive manje dinamičke cjeline unutar postava; kao ritmičke stanke ili brzaci unutar cjeline. Poput kontemplativnog dijela izložbe u sklopu kojeg su izložena djela umjetnika poput Ivana Kožarića, Julije Knifera, Borisa Cvjetanovića, Jasne Šikanje, zatim dijela izložbe koji propituje znak kruga ili spirale kao univerzalnog kozmičkog načela, primjerice u radu Damira Stojnića i Borisa Demura. Krug kao formativni elemenat u konstrukciji slike ili skulpture vidljiv je u djelima primjerice Aleksandra Srneca (slike *Kompozicija U-P-14* iz 1953. te prostornog kinetičkog objekta kružne forme iz 1968.) te skulpture iz serije *Svjetlonosni oblici* Vojina

Bakića iz 1968. Krug kao vibracija, zvuk, sugeriran je zvučnom instalacijom *Stormtellers* (1997) Dalibora Martinisa, postavljenom uz crtež Vjenceslava Richtera iz 1984. Time izložba posvećena krugu, odnosno spirali kao pokrenutoj manifestaciji kruga, započinje vibracijom, odnosno djelima koja bilježe proces transformacije posredstvom vibracije, te se izložba inzistiranjem na kruženju postavom, poput znaka uroborosa, ovdje ponovno vraća.

*U konceptu kruga i spirale izložile ste i jedan od Kniferovih meandara iz 1965. godine. Kada je MMSU Rijeka otkupio navedeni Kniferov rad i posjedujete li još neke njegove meandre?*

K.O.: Od Kniferovih meandara osim izloženog (otkupljenog 1992.), u Zbirci grafika je još mapa serigrafija iz 2003. koju je Muzeju poklonio Ranko Horetzky. Dosta je radova uvršteno u fundus donacijama umjetnika, njihovih bližnjih ili suradnika, uz akvizicije sakupljene dugogodišnjim manifestacijama poput Salona mladih, Bijenala mladih umjetnika Jugoslavije ili Međunarodne izložbe crteža. Politika je otkupa slabašna, osobito u tekućem razdoblju mjera štednje. Tako nam i sam fundus postavlja smjernice za koncepciju izložbi koje možemo razrađivati u pravcu tematskih i studijskih cjelina, kombinirajući radove autora različitih generacija, klasične i eksperimentalne pristupe. Katkad širimo raspon izložbe pozivanjem umjetnika čije bismo radove rado vidjeli u fundusu, kao na primjer, na prošlogodišnjoj izložbi *Iz Trbuha diva* ili skorašnjoj o luminokinetici koju priprema Sabina Salamon.

## **UNIVERZALAN PRISTUP SPIRALI**

*Koji su radovi prožeti životinjskim i biljnim svijetom, što se tiče životne simboličnosti kruga i spirale; puževi, godovi...?*

N.L...: Ne bih rekla da se radovi ove izložbe referiraju izravno na životinjski i biljni svijet, već je pristup spirali univerzalan, odnosno samo iščitavanje tog motiva prepušteno je promatraču. On, dakako, može biti i puževa kućica i god drveta i sama galaksija, zavisi samo hoćemo li se okrenuti ka mikrokozmosu, ili makrokozmosu, spirala je srž. Što se tiče baš puževih kućica, rekla bih da su one vrlo bitan element jedne šire priče o spirali. Kao da se kroz njih taj krugotok iz kojega sve nastaje, materijalizira u savršenstvo ljušture. Tok se skamenjuje, staje. Pjesnik Paul Valéry, kojega Gaston Bachelard citira u svojoj *Poetici prostora*, piše da "mekušac luči svoju školjku", "pušta da curka građevni materijal, i kap po kap iscijedi po mjeri svoje čudesno pokrivalo". Kroz to kapanje puževi od vlastitih tijela stvaraju stabilnost (kuće) u kojoj galaksija

kao da je zaustavljena... I bas negdje na toj medi, na tom putu, dotiču se radovi "koji cure" i "titraju" poput recimo *Kraljice noći* Otta Pienea i *Storm Tellers* Dalibora Martinisa, s onima koji se doslovnije odnose na spiralu kao što je to recimo *Sedmo nebo* Damira Stojnića, odnosno *Chaos Art* Borisa Demura.

## **GLOBALIZAM ILI "RAČUNALA POSTAJU NAŠA JEDINA OGNJIŠTA"**

*Zbog čega ste se kao kustosice odlučile na pisanje zasebnih tekstova u katalogu izložbe i što Vas je osobno i u kontekstu današnje nekropolitike potaklo na istraživanje navedene teme koja bi preko simboličnosti kruga i spirale mogla djelovati harmonično što se tiče danas sukobljenih religioznih sustava?*

N.E.: Zasebni tekstovi nastali su iz osobnog gušta, dok je koncept izložbe nastajao u zajedničkom radu i komunikaciji. Tema kruga jednostavno sama od sebe nameće kretnju, pri čemu smo različita polazišta nastojale uskladiti u koherentan izložbeni program. S druge strane, simbolika kruga već sama po sebi nudi pristup jedinstva. Jung je primjerice u kvadratu vidio simbol pluralističkog psihičkog stanja u čovjeku koji ne nalazi unutarnje jedinstvo, za razliku od kruga kojeg je interpretirao kao krajnju točku jedinstva. Vibracija unutarnjeg jedinstva, cjeline, ravnoteže, već je samo po sebi utkana u dinamičnu strukturu izložbe. Nadalje, nije mala snaga molitve dvadesetak derviša na samom otvorenju izložbe, bilo je to poprilično intenzivno iskustvo za mnoge posjetitelje te večeri koja je izložbom promicala ideju jedinstva kroz različitost.

N.L: Nažalost, današnje društvo je previše udaljeno od svoje esencije, što nema veze samo s nekropolitikom i vječno sukobljenim različitim religijskim sustavima, već unutar toga i s time što u globalizacijskom svijetu "računala postaju naša jedina ognjišta." Gubimo vezu sa samima sobom, i otkrivamo neke (duhovne) stvari koje su našim starima bile itekako poznate. Tako da mi, današnji suvremeni ljudi, uvijek lebdimo iznad površine, i sva naša saznanja u najboljem slučaju donose nas tek na površinu samu, ali ne i ispod nje. A da bismo stigli u dubine, možda nam nulte točke trebaju biti baš ovakve izložbe. One bi trebale biti tek začetak istraživanja...

Budući da nas je tri, nastojale smo imati različite pristupe tekstu, odnosno pristupiti i samim radovima izložbe s različitih gledišta. U dogovoru s kolegicama ovaj sam put umjesto klasičnog teksta predgovora odlučila napisati priču, tako da izložba uz spomenuto zajedništvo vizualne

umjetnosti, znanosti i duhovnosti nudi i dašak književnosti. Priča je nadahnutu radom Otta Pienea *Kraljica noći*, a govori o stvaranju svijeta kroz tok, i što je još važnije - kroz sam jezik.

*U slijedu navedenoga, izložba Sedmo nebo posjeduje svojevrsni humanistički naboj - ona, kako napominjete u katalogu, kroz pripadajuću tematiku kruga uzmiče "sustavu posjedništva, granica i zidina", a i više je nego očit skepticizam prema globalnom napretku.*

N.E.: Izložba promiče zajedništvo znanosti, duhovnosti i umjetnosti. U tom smislu, uz izložbu je u suradnji s Astronomskim centrom Rijeka organiziran popratni program namijenjen djeci, mladima te odraslima. Riječ je o kreativnim radionicama u prostoru Muzeja u sklopu kojih su izložbeni eksponati postali inspirativna polazišta kako za promišljanje umjetnosti tako i za osobno izražavanje i stvaranje, a sve na temu kruga ili spirale. Po završetku radionica u Muzeju edukativni dio programa nastavljao se u Astronomskom centru; uz kraće pokazne radionice o kretanju nebeskih tijela u digitalnom planetariju Centra bili su organizirani filmovi koji prikazuju spiralne kretnje u kozmosu. Izložbeni projekt time je uz vizualnu umjetnost obuhvatio i znanstvenu stranu "priče" o spirali. Napominjemo da smo uz kreativne radionice u Muzeju te film u Astronomskom centru, a sve na temu kruga/spirale, organizirale i riječki *tuRistički autobus* koji nas je uz panoramski pogled na Rijeku i riječki zaljev vozio od Muzeja do Astronomskog centra, pri čemu je cijeli besplatan edukativno/znanstveni program zapravo bio dar Muzeja djeci i mladima, ali i svim građanima te posjetiteljima Rijeke. Nema tu mjesta skepticizmu, zapravo riječ je o ljubavi i htijenju te želji za napretkom unutar tih vrlina.

K.O.: U potpunosti uronjena u kružno gibanje, izložba se dotiče umjetničkih parabola o stanjima opuštenosti, ali i grčenja, osobito karakterističnog za sadašnje doba koje svejedno ne odustaje od potrage za alternativnim smjernicama. Voljele bismo da se beskonačna vrtnja može promatrati kao kritika disfunkcionalnih sustava jer nam se čini da smo danas zapeli u konfuznom tapkanju na jednom mjestu. Zatečenost ponirućim kruženjem koje se podudara sa sinonimom aktualnog ustroja - slikama silazne spirale i začaranog kruga, pojavljuje se u više radova nastalim od devedesetih godina nadalje, poput *Proširene granice* Aleksandra Garbina (1998.-2002.), *Membrane Tympani* Dalibora Martinisa (1995.), *Doline odluke* Petra Brajnovića (2002.) ili *Molite za mir* Tomislava Brajnovića (2005.). Umjesto utopijske vjere u izgradnju društva blagostanja koja se provlači razdobljem visokog modernizma, nailazimo na sve veće ograničavanje čovjekovih mogućnosti, uvjetovano mahnitom utrkom za profitom, svojatanjem prostora i resursa. Raznovrsnim umjetničkim pristupima i izrazima, htjele smo izaći iz pritiska

bivanja u sada i ovdje, otvoriti mogućnost kretanja u različitim smjerovima i paralelnim svijetovima. Zato nam je bila poticajna znanost o kružnim kretanjima nebeskih tijela, vjerski obred derviša ili podsjećanje na krug kao jedan od prvotnih simbola, koji modernu ideju linearnog progressa pokazuje upitnom, odnosno iz današnje perspektive na rubu autodestrukcije.

*Vodeći se Kniferovom izjavom iz 2001. godine "Želio sam biti slobodan od svih restrikcija i ograničenja", ističite da izložba Sedmo nebo također nastoji izmaknuti ograničenjima tradicionalno promišljenih izložbi. Kako shvaćate navedena ograničenja i na koje načine koncepcija Sedmog neba odstupa od navedenoga?*

N.E: Kniferova misao ovdje je iščitana kao žudnja i precizna odluka u isto vrijeme. Želja za slobodom, slobodom stvaranja, pri čemu je ta sloboda interpretirana odsustvom restrikcija i ograničenja. Kniferova misao je inspiracija, govori o želji za slobodom pri čemu sama ima unutarnju snagu i moć oslobađanja. Kniferova misao inkorporirana je u izložbenu koncepciju, kao vodilja, nastojanje, put, želja.

## **ANTROPOLOGIJA UMJETNOSTI**

*U katalogu izložbe ističete da je pri koncipiranju izložbe riječ bila o antropološkom pristupu. Koje ste antropološke postavke koristile pri promišljanju same teme i koncepcije postava izložbe?*

N.E: Forma kruga, odnosno spirale istovremeno je promatrana kroz vizuru više disciplina. Također, krug je promatran i kroz prizmu simboličnog razumijevanja svijeta, poput prevođenja znanja te vidljivih manifestacija u simbole. Uz poštovanje intuicije kao načela povezivanja nivoa realnosti. Između mistike sufizma i interpretacije globalne politike prema viđenju pojedinih ovdje izloženih umjetnika, odnosno uvjetno rečeno racionalističkih stavova, izložba kreće od ideje da niti jedan pristup nije nezavisan, već je uvijek u nekom suodnosu spram drugog. U tom smislu i struktura izložbe u sebi istovremeno ima komponentu znanosti te i simboličnu dimenziju. Izložbeni program tako je cjelina sastavljena od više segmenata i aspekta promatranja, poput povijesti umjetnosti, simbolizma, astrologije, kozmologije, religioznih sistema, edukacije i radioničkog rada, odnosno holističkog pristupa temi koji su u svojim djelima ranije pronosili primjerice povjesničari umjetnosti Erwin Panofsky, Fritz Saxl te Aby Warburg. Nije bilo moguće djela moderne i suvremena vizualne umjetnosti odabrana prema

ključu motiva kruga promatrati isključivo kroz estetsku funkciju djela, razvoj forme ili stila, bez promišljanja o simboličkoj odnosno komunikativnoj razini izložbe.

(...)



## 4.2 Translation of source text 3

### **Nadežda Elezović, Neva Lukić and Ksenija Orelj – The Spiral is the Quintessence**

An interview with the curators of *The Seventh heaven* exhibition (MMCA, Rijeka, 07/14/2016 - 08/14/2016)

*The idea of the Seventh Heaven exhibition includes spirality and a circle at its core. But where did it [the idea] originate from, along with the formation of the curatorial collective that you constitute? How did you spatially arrange the setting in regard to its 'dramaturgical sense', and relation to the meanings of the artworks?*

N.E.: Community would be a more appropriate term than collective. It's about teamwork of us three curators, as well as the collaboration of the Museum of Modern and Contemporary Art with the Astronomical Center Rijeka. Also, when dealing with the form of the circle, the exhibition presents the unity of visual art, science, and spirituality. This exhibition brings together about 30 artworks from the Museum's holdings and unites the work of 28 artists: Getulio Alviani, Vojin Bakić, Petar Brajnović, Tomislav Brajnović, Boris Cvjetanović, Boris Demur, Mirjana Đorđević, Eugen Feller, Aleksandar Garbin, Sanja Iveković, Željko Kipke, Julije Knifer, Ivan Kožarić, Ante Kuduz, Zlatko Kutnjak, Dalibor Martinis, Dan Oki, Ivan Picelj, Otto Piene, Božidar Rašica, Vjenceslav Richter, Lucio Saffaro, Aleksandar Srnec, Melita Sorola Staničić, Damir Stojnić, Jasna Šikanja, Miroslav Šutej and Predrag Todorović.

In contrast to the linear time sequence and chronological exhibition of artworks created during the last sixty years, that is, as opposed to deliberations on art within decades, we preferred to listen to the inner rhythm of the selected works and their mutual communication while working on the exhibition. The circle, as the oldest symbol in the history of mankind, signifies unity, harmony, and wholeness. We tried to integrate these principles into the exhibition. Therefore, some interesting units with lower dynamics within the exhibition were created as pauses in the rhythm or elements with faster flow within the whole, like in the contemplative part of the exhibition in which the works of artists such as Ivan Kožarić, Julije Knifer, Boris Cvjetanović and Jasna Šikanja are displayed. Also, in the part of the exhibition that questions the symbol of the circle or spiral as a universal cosmic principle, for example in the work of Damir Stojnić

and Boris Demur. The circle as a formative element in the structure of a painting or sculpture is visible in the works of, for example, Aleksandar Srnec (the paintings *Composition U-P-14* from 1953 and the spatial kinetic object of a circular form from 1968) and sculptures from the name series *Lightbearing forms* by Vojin Bakić from 1968. The circle as a vibration, a sound, is exhibited by the sound installation *Storm tellers* (1997) by Dalibor Martinis, placed next to a drawing by Vjenceslav Richter from 1984. Thus, the exhibition dedicated to the circle, i.e., the spiral as a moving manifestation of the circle, begins with the vibration, namely with artworks that record the process of transformation through vibration. By insisting on this circulation of the setting, like the sign of the ouroboros, the exhibition returns to where it started.

*In the concept of circle and spiral, you also exhibited one of Knifer's meanders from 1965. When did MMCA Rijeka buy the said Knifer's work, and do you own more of his works from the meander pattern series?*

K.O.: In addition to the one on display (bought in 1992), the Collection of Prints also includes a folder of serigraphs from 2003, which was donated to the Museum by Ranko Horetzky. Many artworks were included in the Museum's holdings through donations from artists, their relatives, or collaborators, along with acquisitions collected through long-standing events such as the Youth Salon, the Biennale of Young Yugoslav Artists, or the International Drawing Exhibition. The purchase funds are limited, especially in the current period of austerity measures. Thus, the holdings set guidelines for the concepts of exhibitions that we can elaborate in different thematic and study units — by combining the works of authors of different generations, and classical and experimental approaches. Sometimes we broaden the array of the exhibition by inviting artists whose works we would like to see as part of the Museum's holdings, as for example, last year's exhibition *From Within the Giant's Belly* or the recent exhibition on lumino kinetic art created by Sabina Salamon.

## **UNIVERSAL APPROACH TO THE SPIRAL**

*Regarding the life symbolism of the circle and the spiral— like snails, tree rings, etc., which artworks are inspired with animal and plant life?*

N.L.: I wouldn't say that the artworks of this exhibition refer directly to animal and plant life, but the approach to the spiral is universal. That is, the perception of that motif is in the eye of the beholder. It can, of course, be a snail's shell or a tree ring or even the galaxy, it just depends on whether we want to observe it from the microcosmic or macrocosmic point of view. However, the spiral is the quintessence. As for the snail shells, I believe that they are a very important part of the broader story of the spiral. It is as if through them the circularity from which everything is created materializes into the perfection of the shell. The process gets petrified; it comes to a stop. The poet Paul Valéry, quoted by Gaston Bachelard in his *The Poetics of Space*, writes that "the mollusk exudes its shell", "it lets the building material seep through, and distills its marvelous cover as needed". As a result of this dripping, the snails from their own bodies create stability (of a house) in which the galaxy seems to be frozen. And somewhere on that border, on that path, 'leaking' and 'vibrating' artworks touch — for example, Otto Piene's *Queen of the Night* and *Stormtellers* by Dalibor Martinis, with those that refer more literally to the spiral, such as Damir Stojnić's *Seventh Heaven*, or Boris Demur's *Chaos-art*.

## **GLOBALISM OR "COMPUTERS BECOME OUR ONLY HEARTHS"**

*Why did you as curators decide to write separate texts in the exhibition catalog? What motivated you personally and in the context of today's necropolitics to research the mentioned topic, which by means of the symbolism of the circle and the spiral, could work harmoniously regarding today's conflicting religious systems?*

N.E.: Separate texts were created for our own pleasure, while the concept of the exhibition resulted from teamwork and communication. The theme of the circle by itself imposes movement. We tried to harmonize the various perspectives into a coherent exhibition program. On the other hand, the symbolism of the circle offers an approach to unity. For example, Jung saw the square as a symbol of a pluralistic psychological state for a person unable to find inner unity, in contrast to the circle, which he interpreted as the ultimate point of unity. The vibration of inner unity, wholeness, balance, are already woven into the dynamic structure of the exhibition. Furthermore, the power of prayer of about twenty dervishes at the very opening of the exhibition did have a great effect on the visitors. It was quite an intense experience, which promoted the idea of unity through diversity.

N.L.: Unfortunately, today's society distanced itself from its essence, which has nothing to do with necropolitics and the eternally conflicting different religious systems, but also with the fact that in the globalized world 'computers are becoming our only hearths.' We are drifting from ourselves, and we are discovering some (spiritual) things that were well known to our elders. So, we, today's modern people, always float above the surface, and all our knowledge brings us to the surface at best, but never below it. And to get to the depths, perhaps we need exhibitions like these to be zero points. They should be the starting point of research.

Since there are three of us, we tried to have different approaches to the text, that is, we tried to approach the artworks of the exhibition from different perspectives. In agreement with my colleagues, this time I decided to write a story instead of a classic foreword, so that the exhibition offers a touch of literature in addition to the unity of visual art, science, and spirituality. The story is inspired by Otto Piene's work *The Queen of the Night* and deals with the creation of the world through circularity, and more importantly – through language itself.

*Taking the above into account, the exhibition The Seventh Heaven is of humanistic nature. As you note in the catalog, it distances itself from the „system of ownership, boundaries and walls“ through the associated theme of the circle. The exhibition also represents more than obvious skepticism towards global progress.*

N.E.: The exhibition promotes the unity of science, spirituality, and art. Regarding that, an accompanying program to the exhibition was organized for children, young people, and adults, in cooperation with the Astronomical Center Rijeka. Creative workshops in the Museum are the matter in question, in which the exhibits became an inspiring starting point for thinking about art as well as for personal expression and creation, all related to the circle or spiral. After the workshops in the Museum, the educational part of the program continued in the Astronomical Center. In addition to shorter demonstration workshops on the movement of celestial bodies, films were organized in the Center's digital planetarium showing spiral movements in the cosmos. In addition to visual art, the exhibition project also included the scientific side of the spiral. Along with the creative workshops in the Museum and the film in the Astronomical Center (all on the theme of the circle/spiral) we also organized the Rijeka *touRist bus* (AN), which drove us from the Museum to the Astronomical Center with a panoramic view of Rijeka and the Rijeka Bay. Since the educational/scientific program was a gift of the Museum to children, young people, and to all citizens and visitors of Rijeka, all of it

is free of charge. There is no room for skepticism here, it's about love and determination and the desire for progress within these virtues.

K.O.: Completely immersed in circular motion, the exhibition touches on artistic parables about states of relaxation, but also of tension, especially characteristic of the current era, which never ceases to search for alternative directions. We wish the endless spinning could be seen as a critique of dysfunctional systems because today we seem to be stuck in a groove. Bewilderment with the plunging circulation that coincides with the symbol of the current system – the images of the descending spiral and the vicious circle appear in several artworks created from the nineties onwards, such as Aleksandar Garbin's *Expanded Borders* (1998 – 2002), Dalibor Martinis's *Membrane Tympani* (1995), Petar Brajnović's *Valley of Decision* (2002) or Tomislav Brajnović's *Pray for Peace* (2005). Instead of the utopian faith in the construction of a welfare society that permeates the period of high modernism, we encounter an ever-increasing limitation of human possibilities conditioned by a frantic race for profit, and appropriation of space and resources. With a variety of artistic approaches and expressions, we wanted to get out of the pressure of *being here and now* and open the possibility of moving in different directions and parallel worlds. That is why we were encouraged by the science of the circular movements of the heavenly bodies, the religious rite of dervishes and the reminder of the circle as one of the primary symbols. The circle questions the modern idea of linear progress, i.e., from today's perspective, it portrays that idea as being on the verge of self-destruction.

*Guided by Knifer's statement from 2001, "I wanted to be free from all restrictions and limitations", you point out that The Seventh Heaven exhibition also tries to escape the limitations of traditionally thought-out exhibitions. How do you understand the stated limitations and in what ways does the concept of The Seventh Heaven deviate from the stated?*

N.E.: Knifer's thought is understood as a desire and a prudent decision at the same time. The desire for freedom, the freedom to create, where this freedom is interpreted by the absence of restrictions and limitations. Knifer's thought is an inspiration, it speaks of the desire for freedom, which itself has inner strength and the power to liberate. Knifer's thought is integrated into the exhibition concept, as a guide, an effort, a path, a desire.

## **ANTHROPOLOGY OF ART**

*In the exhibition catalog, you point out that while arranging the exhibition, you took an anthropological approach. What anthropological assumptions did you consider when thinking about the theme itself and the concept of the exhibition?*

N.E.: The form of the circle, or spiral, was simultaneously observed through the lens of several disciplines. In addition, the circle was observed through the prism of a symbolic understanding of the world, such as the translation of knowledge and visible manifestations into symbols, while respecting intuition as the principle of connecting the levels of reality. Between the mysticism of Sufism and the interpretation of global politics according to the views of certain artists exhibited here, i.e., rationalist attitudes, the exhibition starts from the idea that neither approach is independent but is always in some correlation to the other. In that sense, the structure of the exhibition has both a scientific component and a symbolic dimension. The exhibition program is thus a whole composed of several segments and aspects of observation, such as history of art, symbolism, astrology, cosmology, religious systems, education, and with the help of workshops, i.e., the holistic approach to the subject previously conveyed in the works by, for example, art historians Erwin Panofsky, Fritz Saxl and Aby Warburg. It was simply impossible to observe the artworks of modern and contemporary visual art selected according to the motif of the circle exclusively through the aesthetic function of the artwork, the development of form, or style, without taking the symbolic or communicative level of the exhibition into consideration.

(...)

### 4.3 Commentary and analysis

The first major problem I encountered while translating this text was the title. A title in a way represents an opening to the text and it is important that its translation conveys the same feeling in the reader as it conveys in the ST, i.e., it has to encourage him/her to read the text. The title *Spirala je srž* is not a grammatically complex expression, however, it is exactly such expressions that often pose a considerable challenge in translating titles. Since the title is short and catchy, its translation should be short and catchy as well. The term *srž* can be translated as either *core*, *essence*, or *quintessence*. In this case, according to the Merriam-Webster dictionary, the terms *core* and *essence* both mean a significant or foundational element, which is an accurate translation, but the authors of this interview provide the spiral with even more importance than that. *Quintessence* bears a similar meaning to *core* and *essence*, but according to the Merriam-Webster dictionary, it represents the essence of a thing in its purest and most concentrated form and is the most typical example or representative. By taking this into account, I translated the title as *The Spiral is the Quintessence*. The capital letters were used to emphasize, and with that, the importance of the spiral in this exhibition was established.

After reading this interview in Croatian, it was evident that the strange and ambiguous word orders and the use of unusual terms would pose an obstacle to translate this ST into the English language.

The question *Kako je nastala ideja izložbe Sedmo nebo, koja u svojoj srži obuhvaća spiralu / spiralnost i krug, te formiranjem kustoskog kolektiva koji i činite?* is vaguely formulated in the ST and the translator's task here is to provide a better sense in the target language. To make it more comprehensible and coherent, I have divided it into two segments, but added the subject in the second segment in square brackets. Square brackets are commonly used when an author (in this case the translator) alters or adds information for a better understanding of the text. I then translated the sentence as *The idea of the Seventh Heaven exhibition includes spirality and a circle at its core. But where did it [the idea] originate from, along with the formation of the curatorial collective that you constitute?*

Another example of a semantically noteworthy sentence, or in this case a noteworthy question is *Kada je MMSU Rijeka otkupio navedeni Kniferov rad i posjedujete li još neke njegove meandre?* For an artist, this question is more than crystal clear, but to someone who is ignorant in regard to this field it could pose a difficulty to understand. The meander mentioned

in this question is a decorative edge used in art and architecture, reminiscent of a river's curve. What may confuse the reader in this case is that the river's curve is also called a meander. So, when translated only as a meander it would be clear to a person who is into art, but to people who are not in the know, it could be a bit too vague. Since this decoration is also called the Greek key and the Greek meander<sup>22</sup>, it was an option, but since it is unclear if it would still convey the correct meaning, I decided to translate it descriptively. Descriptive translation is often used when there is no equivalent in the target language, so a translator describes or paraphrases the source text to correctly bring the message across. The sentence was translated as *When did MMCA Rijeka buy the said Knifer's work, and do you own more of his works from the meander pattern series?*, which makes it comprehensible to all.

An additional example of an unusually worded sentence in the ST is *Politika je otkupa slabašna, osobito u tekućem razdoblju mjera štednje* where the author should have opted for a simpler word choice to explain how they currently do not have enough money for further purchases. If translated literally, the sentence would basically be *The purchase policy is fragile, especially in the current period of austerity measures*, but the meaning remains unclear. This is an example of a sentence where a translator must intervene to translate the text in the spirit of the target language. In order for the sentence to be easily understood by all readers, I decided to translate it by using simpler terms, so the translated sentence is *The purchase funds are limited, especially in the current period of austerity measures*. However, it is important to note that when translating for a client (and not for the purpose of a thesis) one should always consult him/herself with the client to see if they agree with the text being slightly (or significantly) altered in favor of a better comprehension.

Another example where I needed to slightly intervene in the text is the *riječki tuRistički autobus*. This is a word game, because Ri is the abbreviation for the city of Rijeka, and it is hidden in the name of the tourist bus. But for the word game to be correct, both letters should be capitalized in an abbreviation, which is not the case in the transcript of this interview. The correct way to write it is *Rijeka touRIst bus (AN)*, with the remark (AN) – Author's note, so that both the reader and the author know that the name was altered in the translation.

The sentence *Voljele bismo da se beskonačna vrtnja može promatrati kao kritika disfunkcionalnih sustava jer nam se čini da smo danas zapeli u konfuznom tapkanju na jednom*

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<sup>22</sup> Loth, C. *The Complex Greek Meander*: <https://www.classicist.org/articles/classical-comments-the-complex-greek-meander/>



*mjestu* was challenging to translate because of the ending. If the part *konfuznom tapkanju na jednom mjestu* was translated literally, it would not conform to the English language, so I had to either translate it descriptively or to use an idiom. The first idiom that came to my mind was *stuck in a rut* which, according to the Cambridge Dictionary, means to be too fixed in one particular type of activity or job. After researching other idioms in the Cambridge Dictionary, the idiom *stuck in a groove* caught my attention. The meaning of this idiom is to be bored because you are doing the same things that you have done for a long time, and that is exactly what the authors meant in the ST. Apart from the meanings of the idioms, the text is full of references to the spiral and the circle, and in order to preserve the feeling of motion I decided to translate this part with *to be stuck in a groove*. The full sentence was then translated as *We wish the endless spinning could be seen as a critique of dysfunctional systems because today we seem to be stuck in a groove.*

The sentence *Time izložba posvećena krugu, odnosno spirali kao pokrenutoj manifestaciji kruga, započinje vibracijom, odnosno djelima koja bilježe proces transformacije posredstvom vibracije, te se izložba inzistiranjem na kruženju postavom, poput znaka uroborosa, ovdje ponovno vraća* has also proven to be quite challenging for translation. Even though this sentence functions very well in Croatian, it is lengthy in English, so it first had to be split up. I put a full stop at the end of the first compound sentence, after *transformacije posredstvom vibracije*, since the second segment of the sentence is not dependent on the first. By using such shorter sentences I did not lose the meaning but helped preserve the natural flow of the spoken language. Another tricky part of this sentence was the end. The part *ovdje ponovno vraća* can easily be understood from a spatial point of view, but without taking the space into account, it sounds a bit unusual. After analyzing it logically, it is clear that the exhibition can only return to where it started, which is again a reference to the spiral and circle. By translating it just as *the exhibition returns here again*, the reader might get confused to where this ‘here’ exactly is. So, in order to avoid any misunderstanding, I translated the sentence in this way: *Thus, the exhibition dedicated to the circle, i.e., the spiral as a moving manifestation of the circle, begins with the vibration, namely with artworks that record the process of transformation through vibration. By insisting on this circulation of the setting, like the sign of the ouroboros, the exhibition returns to where it started.*

Another weird and incomprehensible sentence was *Također, kako ste "dramaturški" prostorno koncipirale sam postav u odnosu na značenja samih radova?* The problem here is the *"dramaturški" prostorno* because it conveys the meaning that the arrangement of the

artworks is dramaturgical, but the expression should have been formed clearly to suggest the dramaturgical sense of the artworks and how they were arranged accordingly. After rewriting this sentence a couple of times, in order to find multiple translational solutions, the translation which sounded most *natural* was *How did you spatially arrange the setting in regards to its 'dramaturgical sense', and relation to the meanings of the artworks?* With this solution, I slightly favored the interviewer, but the adjustment was necessary to convey the accurate meaning and to translate this question in the spirit of the target language. An additional problem in this sentence worth mentioning is the use of wrong quotation marks. The transcriptionist here used double quotation marks for emphasis of the word *dramaturški*. However, double quotation marks are used for direct quotations, and not for emphasis. The proper way to write it would be either 'dramaturški' or using italics – *dramaturški*. This is a significant example of how a translator not only translates from one language to another, but he/she has to have abundant linguistic expertise and attention to detail.

There were other demanding sentences where inversion was necessary to put the important parts into focus. The sentence *Koji su radovi prožeti životinjskim i biljnim svijetom, što se tiče životne simboličnosti kruga i spirale; puževi, godovi...?* could have been translated into the English language with the same word order as in Croatian, however, it deemed more appropriate to use inversion. Inversion is commonly used with questions when there is a need for emphasis. In this case, the emphasis should stay with the spiral and the circle. The Croatian word *prožet* from this sentence has its equivalent in the English language – *imbued*. However, according to the Merriam-Webster dictionary, *imbue* means to permeate or influence as if by dyeing, which significantly deviates from the meaning of its Croatian equivalent. On the other hand, the term *inspired* means to influence or to affect, which effectively conveys the author's idea into the target language. After inverting this sentence to put the spiral and circle in focus, and after deciding on the right English equivalent for the word *prožet*, the sentence was translated as *Regarding the life symbolism of the circle and the spiral— like snails, tree rings, etc., which artworks are inspired with animal and plant life?*

While translating an interview, it is important to be as literal as possible to correctly communicate the author's idea across, but sometimes (and in agreement with the client), one can slightly (or significantly) intervene.

An example of this can be found at the beginning of the interview in the already mentioned sentence *Također, kako ste "dramaturški" prostorno koncipirale sam postav u odnosu na značenja samih radova?* This sentence focuses on the exhibition setting, and it could

be literally translated as *to conceptualize the setting* which bears the meaning of forming a concept or something. Although this choice of words is suitable in Croatian, the English translation fails to capture the essence of the target language, so I had to look up verbs which are used with *setting* (noun). Two most commonly used verbs with *setting* are *set up* and *to arrange*. It sounds more *natural* to say *arrange a setting*, than *to set up a setting* because of repetition. Another appropriate solution would be to translate this sentence as *arrange the exhibition*, but since the author used the term *postav* (*setting*), and not *exhibition* (*izložba*), it was not necessary to alter it to that extent, so I decided to leave *to arrange the setting*.

An additional example of a sentence which had to be altered to avoid repetition is in *Riječ je o izložbi koja u zajedništvo okuplja 30-ak djela iz fondusa Muzeja te u jedinstvu prikazuje stvaralaštvo 28 umjetnika/ica*. Here the verbs *okupljati* and *prikazivati u jedinstvu* can both be translated as *bring together* but in order not to use the same verb in the same sentence twice, I decided to go with a synonym, namely *unite*, which has the same meaning. The final translation of this sentence is *This exhibition brings together about 30 artworks from the Museum's holdings and unites the work of 28 artists*, which is easier to read and to understand.

A common obstacle translators encounter are sentences that contain terms which can have many alternative meanings in the target language. An excellent example thereof can be found in the sentence *Ne bih rekla da se radovi ove izložbe referiraju izravno na životinjski i biljni svijet, već je pristup spirali univerzalan, odnosno samo isčitavanje tog motiva prepušteno je promatraču*. To begin with, the sentence needed to be split into two segments. It is overly lengthy in English, so I put a full stop after *univerzalan*. Another aspect that required refinement was *isčitavanje motiva*. The literal translation would be *to read or understand the motif*, but that solution does not conform to the target language. So, I decided to use the most *logical* solution, which was *perception*, and according to the Merriam-Webster dictionary, it is an individual's mental image, meaning it is not universal and one has to find the meaning of an artwork for himself. The last part of the sentence *prepušteno je promatraču* could have also been translated literally, but since English is abundant with idioms, it was only *natural* to use the idiom *the beauty is in the eye of the beholder*, it just needed to be slightly altered to fit this sentence. Idioms are phrases that, when taken as a whole, have a completely different meaning from the meanings of its individual words.<sup>23</sup> So the translated sentence is *I wouldn't say that the artworks*

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<sup>23</sup> *What is an idiom?* <https://www.grammarly.com/blog/idiom/>

*of this exhibition refer directly to animal and plant life, but the approach to the spiral is universal. That is, the perception of that motif is in the eye of the beholder.*

It is interesting to note that such source texts frequently refer to works of other authors, such as in the sentence *Pjesnik Paul Valéry, kojega Gaston Bachelard citira u svojoj Poetici prostora, piše da "mekušac luči svoju školjku", "pušta da curka građevni materijal, i kap po kap iscijedi po mjeri svoje čudesno pokrivalo"* Whenever another work is mentioned or cited in a paper, the translator must familiarize him/herself with it and research if it is available to him/her. After researching *Poetika prostora*, I found the English version of it (*The Poetics of Space*) and translated this sentence with its help. Since this sentence was cited from the book, it was easy to translate it, however, a translator must bear in mind that whenever a citation is included, it should be noted either in form of a footnote or directly in the text. So, the translated sentence is *The poet Paul Valéry, quoted by Gaston Bachelard in his The Poetics of Space, writes that "the mollusk exudes its shell", "it lets the building material seep through, and distills its marvelous cover as needed"*. Another thought-provoking aspect in this sentence is that some words could have been translated in a different way. Instead of *as needed* in the end of the sentence, the verb *to fit* (or its synonym) could have also worked here. The same can be applied to the verb *to distill* which can be replaced with *to extract*, but since the original book *The Poetics of Space* is accessible to everyone, it is permissible to *copy* the exact translation and include a footnote with the reference to it. In this way, with the help of a short research, a sentence which would have presented a challenge for the translator was solved in a quick and accurate way.

## 5. CONCLUSION

In this thesis, I examined the challenges I faced while translating three different texts. During the translatorial process, I noticed that the most problems I encountered were connected to semantics, despite the generic and thematic differences.

While translating the text on marine biology, my focus was on translating and explaining the abundance of technical terminology, which resulted in fewer problems related to syntax and structure. Since there is no universal Croatian-English dictionary for marine biologists available, I had to consult experts. Similarly, the veterinary text on gray wolves was also challenging to translate because of its technical terminology, but the sentences' structure was less demanding to read. To conform to the rules of scientific writing, it was necessary to make some changes to these *simpler* sentences – some had to be split into two, and some could be combined into one to avoid repetition. The interview with the curators of the art exhibition also posed a difficulty in translation because of the use of colloquial language. In addition to that, the answers given by the curators were long and oftentimes confusing, and it was necessary to read the sentences several times to determine the precise meaning and to accurately convey it into the English language.

Taking all this into consideration, it is evident that the importance in translation lies with conveying the meaning of the source text accurately into the corresponding meaning in the target language, however, reasonable adjustments regarding syntax or style are allowed. Translators must continually expand their knowledge and adapt to the ever-changing language(s). As Alexander Fraser Tytler stated in his *Essay on the Principles of Translation*:

*... it is the duty of a translator to attend only to the sense and spirit of his original to make himself perfectly master of his author's ideas, and to communicate them in those expressions which he judges to be best suited to convey them.*<sup>24</sup>

Translators' ability to evoke the same emotions in the target audience to those felt by readers of the source text deserves a great respect. Even though translators work *behind the scenes*, and are often not recognized enough by the public, their task is of great importance – they bridge the language barriers and allow for easier communication between people from different linguistic backgrounds.

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<sup>24</sup> Tytler, Alexander Fraser: *Essay on the Principles of Translation*, p. 35

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