



# PRAGMATICK

Training School about application of citizen science to prevent tick and tick-borne disease risk



Teaching Institute for Public Health of the County of Istria

## Citizen Science and Community Engagement in Tick Surveillance in Istrian County, Croatia



*mr. sc. Maja Cvek, dipl. ing. biol.*

# Project: Monitoring of ticks in the Istrian County

## The goal of the project:

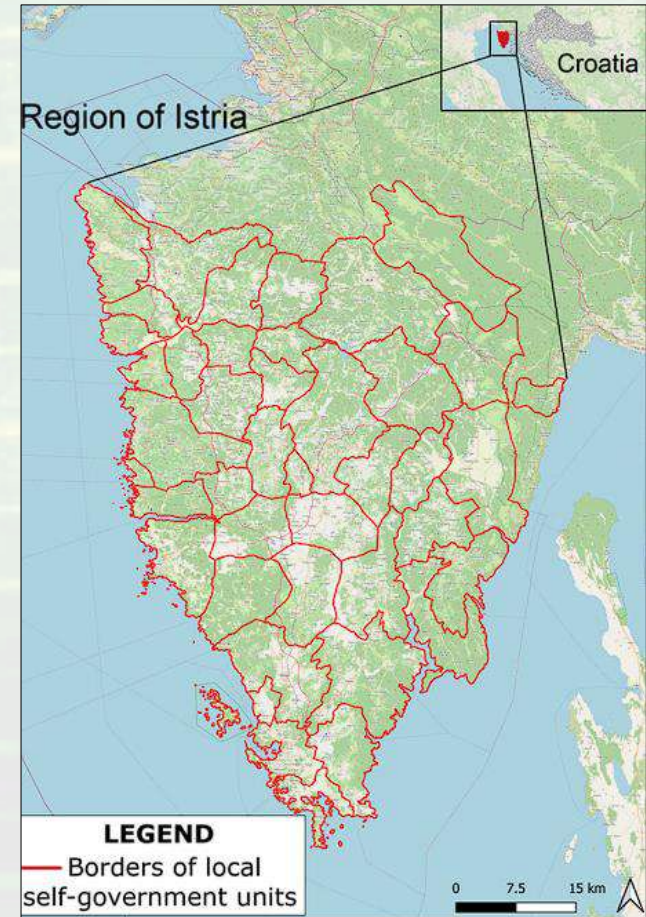
- to investigate and determine the fauna of hard ticks in Istria County
- the establishment of a permanent monitoring system and the creation of a database to monitor areas of stronger tick infestation
- proving the presence of pathogens in ticks by molecular methods
- monitoring the incidence of diseases transmitted by ticks and making risk assessments of infection
- public education with an emphasis on groups that are more often exposed to tick bites

## PhD thesis:

Identification of tick species in the Istrian County and determination of the presence of pathogenic microorganisms

### Istrian County

- the westernmost Croatian county,
- Area: of 2,820 km<sup>2</sup>,
- It consists of 10 cities and 31 municipalities.



*Geographic location of the sampling area in the region of Istria, Croatia*

# 1. Methods of tick collection

## How much? How? Where?

- $\approx 500$  locations  $\rightarrow \approx 2000$  ticks
- **Flagging / dragging method**
  - mainly in the low layer of bushes along the edges of forests or forest paths - ecotone, urban parks and meadows, different habitats



We can do it

- **From from the host:** a) humans + b) animals

We can not do it

**We need citizens!**

But who?

- Istrian County: 41 units of local self-government

Every unit: **must have 2.a + 2.b**

Urban / non urban areas



## HOW TO START? Some tips...

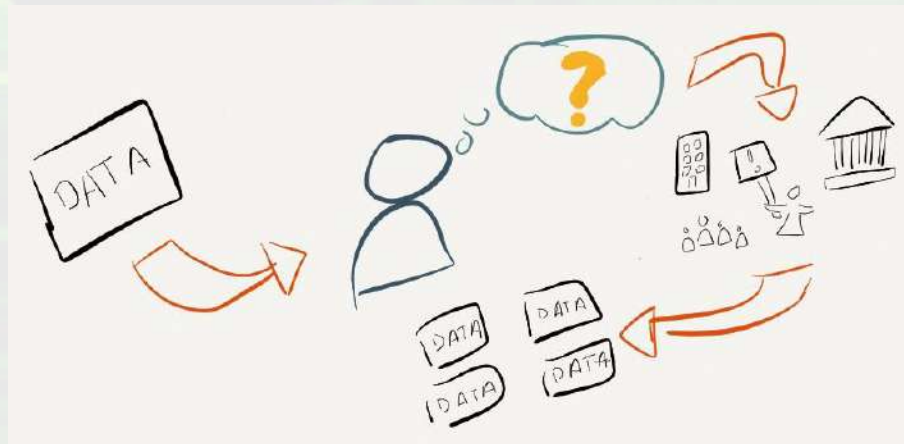
### Project planning – 1st year

Plan early enough (a year in advance) due to inclusion in stakeholders' budgets for next year.

How to get money?

How to get ticks?

How to get data?



## Identification of stakeholders

### Decision makers

**Risk groups exposed to ticks:** foresters, soldiers and mountaineers, hunters, farmers, herdsman, hikers, tourists...

**Professional staff in contact with ticks and TBD:** veterinarians, doctors, foresters, soldiers and mountaineers, hunters, farmers, herdsman, hikers, tourists...



# ENGAGEMENT OF STAKEHOLDERS



## 1. step

A different approach for everyone

### 1. decision makers

On the level:

- counties,
- local self-government units

media  
coverage

### 2. profession

- biologists,
- foresters,
- doctors / medics,
- veterinarians

### 3. citizens

- hunters,
- individuals, acquaintances,
- work colleagues,
- horse breeders,
- NGOs, eg scouts, mountaineers,
- worried parents,
- school projects...



## 2. step

# RESEARCH PLAN

## In situ



### Collecting ticks - organisation



from the field

Flagging / dragging method



humans

- individuals
- emergency medical care
- doctors
- NGO



animals

wild

Hunters  
veterinarians



pets

owners  
veterinarians



domestic animals

# ENGAGEMENT OF STAKEHOLDERS

## 1. decision makers

### 1. County

- obtaining support in any form (support document, media coverage, financial resources,
- They have influence on local self-government units (jurisdiction)
- We made a joint press conference for the media with an invitation to citizens...

### 2. local self-government units

- They are more willing to get involved in the project if they see that the county also supports the project.

*Given that cities have larger sources of income than municipalities, we have concentrated our search for support on cities (Pula, Poreč, Pazin, Vodnjan...) and ev. some municipality (Medulin...)*



# STAKEHOLDERS

## How to approach?

1. **at a higher level - county - find key persons of interest** (most often based on acquaintances) e.g.:
  - Department for Economy and Agriculture, Sustainable Development Dep.,
  - Department for Health and Social Welfare,
  - Department for Agriculture, Forestry, Hunting, Fisheries and Water Management...

*At this moment, don't bother a lot the person you are talking with, just the basic details and ask which department is the best to contact.*

## Clearly present their benefit of the project - try to look through their prism

- E.g. human or animal health
- something new that no one has done yet (eg you are the first in country / county)
- something useful
- emphasize that you will promote them
- promise them that they will be able to use the data for their own purposes later...
- ...

## TIPS

### **When it is finally agreed which department could participate, make agreement**

- before you apply for the tender check the maximum amount you can count on
- media support: they usually have annual agreement,
- if an institution (or several of them) calls a press conference, more journalists will show up, than if an individual does it.

## MEDIA COVERAGE OF THE PROJECT BY THE INSTITUTE

- **Choose the key moment** – in the spring when the ticks start, we started with campaign, articles in print media, TV and radio shows.
- **Emphasize the importance of the topic** - very relevant topic, but little is known about it, there is not much research in our area, it is not known what the prevalence of the pathogens is.
- **Find an intriguing question**, e.g. public opinion on the subject, for example, in general Istria is known as a region that does not have diseases transmitted by ticks. *Is this a myth or the truth?* We want to investigate the accuracy of that claim...
- **Checking of data before publication**: if it is possible to submit texts to the media and ask for the text to be reviewed before publication.



## MEDIA COVERAGE

- Preparation, delivery and publication of ALL educational materials – all at the same time
- creating a online GIS database
- At the same time, start educating citizens
- And start collecting with the flagging / dragging method

 NASTAVNI ZAVOD ZA JAVNO ZDRAVSTVO ISTARSKE ŽUPANIJE  
ISTITUTO FORMATIVO DI SANITA' PUBBLICA DELLA REGIONE ISTRIANA

**Monitoring krpelja na području Istarske županije**

**Found a tick on you, your dog or cat?  
Don't panic!**

Please deliver the collected ticks to us for your and our safety.  
By finding ticks, you can contribute to human and veterinary medicine.

Svaki dostavljeni krpelj će se pohraniti i putem PCR metode će se dokazivati da li je krpelj zaražen nekim uzročnikom bolesti. Neke bolesti uzrokuju teške kliničke slike, praćene s brojnim komplikacijama i dugotrajnim oporavkom. Ukoliko se ne liječe mogu ostaviti trajne posljedice.

Pravilno uklanjanje krpelja	Kako dostaviti krpelja?
Pincetom uhvatiti krpelja što bliže koži i ukloniti laganim povlačenjem prema gore. Ne okrećite ga i ne trzajte njime jer mu rilce i glava mogu ostati zabodeni u kožu. Zaostalo rilce izvaditi sterilnom iglom ili pincetom. Nakon uklanjanja krpelja, ugriz i ruke očistite alkoholom ili vodom i sapunom. <b>Ne koristiti</b> alkohol, benzin, aceton, masnoće, usijani predmet i dr.! Na taj način krpelj može izbaciti sadržaj hrane s patogenom i još jače se ukopati u kožu domaćina.	Krpelja dostavite Zavodu na analizu. U bilo kakvoj posudi u koju ste obavezno stavili vlat trave ili komadić navlaženog ubrusa kako bi krpelj imao dosta vlage koja mu je neophodna da bi preživio. Ovako pohranjen krpelj može u običnom hladnjaku preživjeti i do sedam dana što vam ostavlja više vremena za organizaciju dostave uzorka krpelja. <b>Kontakt: 099 819 4395</b>



*Instructions on how to deliver ticks*

## EDUCATION OF CITIZENS

- *stands on public areas of cities*



## EDUCATION OF CITIZENS

- **Hunting Association of the Istrian County**  
**Program for the improvement of hunting in the Istrian County**

ticks have been inserted  
In document

**They co-finance us for education and research**

**We held lectures for representatives of  
all hunting associations**

*It would be better if the lectures were held  
in each hunting association individually - a  
larger number of interested parties.*

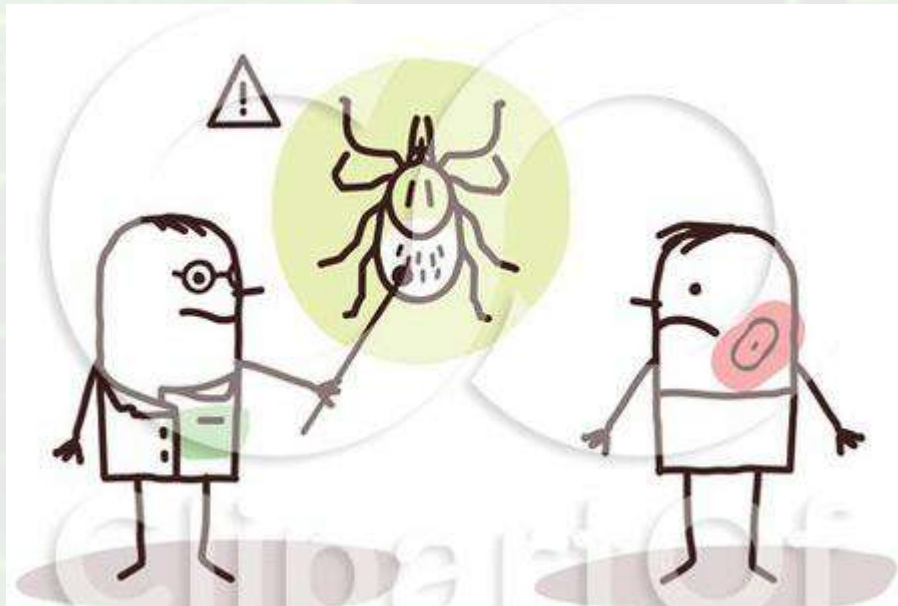


POČETNA | O NAMA | **LOVAČKA DRUŠTVA** | LOVIŠTA | ZAKONODAVSTVO | LOVNA KINOLOGIJA | LOVNO STRELAŠTVO

R. br.	Lovačko društvo - udruga	Naziv	Adresa	Pošta
1	Lovačko društvo	"Balcin" Vinež	Dom Srušići bb	52220 Labin
2	Lovačka udruga	"Bena" Ljubjan-Sitan	G. Dobran 87	52100 Pula
3	Lovačko društvo	"Čakolja" Lanišće	Lanišće bb	52422 Lanišće
4	Lovačko društvo	"Diana" Momjan	Štancijeta 130	52462 Momjan
5	Lovačko društvo	"Dubrava" Vinjan	52463 Vinjan	52463 Vinjan
6	Lovačko društvo	"Fazan" Buje	Istarska 36	52460 Buje
7	Lovačka udruga	"Fazan" Kaštelir-Višnada	Muškeci 2	52447 Višnada
8	Lovačko društvo	"Fazan" Motovun	Veli jože 1	52424 Motovun
9	Lovačko društvo	"Golubi" Kanfanar	Trg M. Željka 5	52352 Kanfanar
10	Lovačka udruga	"Golubi" Tinjan	Tinjan 2	52444 Tinjan
11	Lovačko društvo	"Istra" Pula	Marka Marulića 4	52100 Pula
12	Lovačko društvo	"Jarebica" Bale	Istarska 13	52211 Bale
13	Lovačka udruga	"Jarebica" Svetvinčenat	Svetvinčenat bb	52342 Svetvinčenat
14	Lovačko društvo	"Jedinstvo" Vodnjan	Trg slobode 12	52215 Vodnjan
15	Lovačko društvo	"Kamenjarka Pikan" Pikan	Čehi 2 d	52332 Pikan
16	Lovačko društvo	"Kamenjarka" Barban	Barban 69	52207 Barban
17	Lovačko društvo	"Kamenjarka" Krnica	Krnica bb	52208 Krnica
18	Lovačko društvo	"Kamenjarka" Labin	Ripenda Verbančić 5d	52220 Labin
19	Lovačka udruga	"Kojinka" Gračisce	Loža 1	52403 Gračisce
20	Lovačko društvo	"Lepus" Bitonigla	Bumarsko 2	52474 Bitonigla
21	Lovačko društvo	"Lim" Vrsar	Trg Degrossi 5	52450 Vrsar
22	Lovačka udruga	"Marčana" Marčana	Marčana 128	52206 Marčana
23	Lovačko društvo	"Mirna" Buzet	Trg Funtana 7	52420 Buzet
24	Lovačko društvo	"Paka" Novigrad	Bužinija bb	52466 Novigrad
25	Lovačko društvo	"Roč" Roč	Kertina 1	52425 Roč
26	Lovačko društvo	"Rovinj" Rovinj	43. istarske divizije 36	52210 Rovinj
27	Udruga lovaca	"Sma" Sv. Lovreč	Istarska 28	52448 Sv. Lovreč
28	Lovačko društvo	"Srnjak" Grožnjan	Motovunska 2	52429 Grožnjan
29	Lovačka udruga	"Srnjak" Lupoglav	Lupoglav 17	52426 Lupoglav
30	Lovačko društvo	"Šiljuka" Cerovlje	Cerovlje 12	52402 Cerovlje
31	Lovačko društvo	"Trška" Umag	Galčić 45 k	52470 Umag
32	Lovačko društvo	"Ubalj" Koromačno	Koromačno 17	52222 Koromačno
33	Lovačko društvo	"Ulimon" Pula	Kukuljevićeva 5	52100 Pula
34	Lovačko društvo	"Vepar" Oprtalj	Lovačka kuća bb	52429 Oprtalj
35	Lovačka udruga	"Vepar" Pazin	154. Brigade Hrvatske vojske 19	52000 Pazin
36	Lovačko društvo	"Zec" Krišan	Istarska 5	52333 Potpićan
37	Lovačko društvo	"Zec" Poreč	St. Kaligari 50	52440 Poreč
38	Lovačko društvo	"Zec" Žminj	Pazirnska cesta bb	52341 Žminj

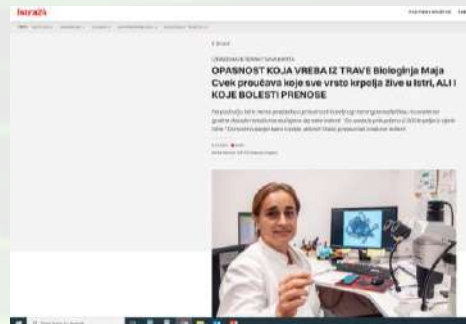
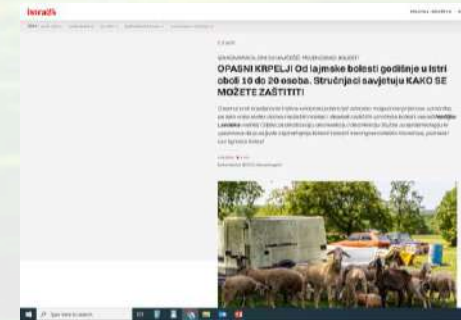
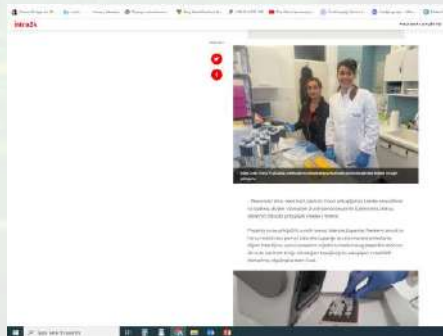
## EDUCATION OF CITIZENS

- *Education of doctors*
- All general practitioners and emergency medical doctors in Istria were sent a presentation about ticks by email and educational leaflets in printed and digital way.
- They were often reminded of the importance of ticks and asked again and again to collect them.



# PUBLIC EDUCATION

Media coverage and public awareness  
We were present in every kind of media





# PUBLIC EDUCATION

## Lectures held for interest groups



h.istarda@ihz.com.hr 952 / 402 299 Stanje Kaligari 18, 52040 Pareni Pon - pet: 7:00 - 15:00

**LOVAČKI SAVEZ**  
ISTARSKE ŽUPANIJE

Lovački savez Istarske županije

POČETNA O NAMA LOVAČNA DRUŠTVA LOVIŠTA ZAKONODAVSTVO LOVNA KINOLOGIJA LOV

**EDUKACIJA LOVACA – MONITORING KRPELJA**

MI 4 2021

Stručno predavanje/lezione di esperti: mr. sc. Maja Cvek  
Krpelji u Istri pod lupom znanstvenika  
Le zecche in Istria sotto la lente d'ingrandimento degli scienziati



NAŠTAVNI ZAVOD ZA JAVNO ZDRAVSTVO ISTARSKE ŽUPANIJE  
ISTITUTO FORMATIVO DI SANITÀ PUBBLICA DELLA REGIONE ISTRIANA  
Služba za epidemiologiju  
Odjel za dezinfekciju, dezinfekciju i dezinfekciju  
e-mail: [hhz@ihz.hr](mailto:hhz@ihz.hr)  
tel. ++385 52 520 033

29. ožujka 2023., u 17:00 sati  
29 marzo 2023 alle 17:00

Lovački dom "Rovinj"  
Casa del cacciatore Rovigno  
43. Istarske divizije 36, Rovinj



Društvo za zaštitu životinja i prirode Rovinjske njuškice  
L'associazione per la protezione degli animali e della natura-Musetti roviginesi  
Associazione for Animal and Nature Protection Rovinj Muzzes



# WEB SITE OF INSTITUTE

The screenshot shows the website for the Institute for Public Health of the Istrian Region. The main heading is "MONITORING KRPELJA NA PODRUČJU ISTARSKE ŽUPANIJE". Below this, there is a section titled "Monitoring krpelja na području Istarske županije" with a sub-heading "Često postavljana pitanja o krpeljima". The text describes the project's goals and objectives, mentioning the use of GIS technology to map tick collection sites. A list of "Dodatne informacije" (Additional information) is provided, including links to tick species, collection methods, and disease transmission. A photograph of hikers in a forest is also visible.

The screenshot shows a GIS application interface. On the left, there is a metadata panel for a layer named "LEPJE" (Ticks). The metadata includes details such as "Projekat: Istraživanje", "Datum: 20.09.2017", and "Status: 100%". Below the metadata, there are icons for three tick species: Ixodes ricinus, Ixodes trianguliceps, and Ixodes ricinus. On the right, a map of Istria is displayed with several red markers indicating the locations where ticks were collected. The map includes a scale bar and a north arrow.

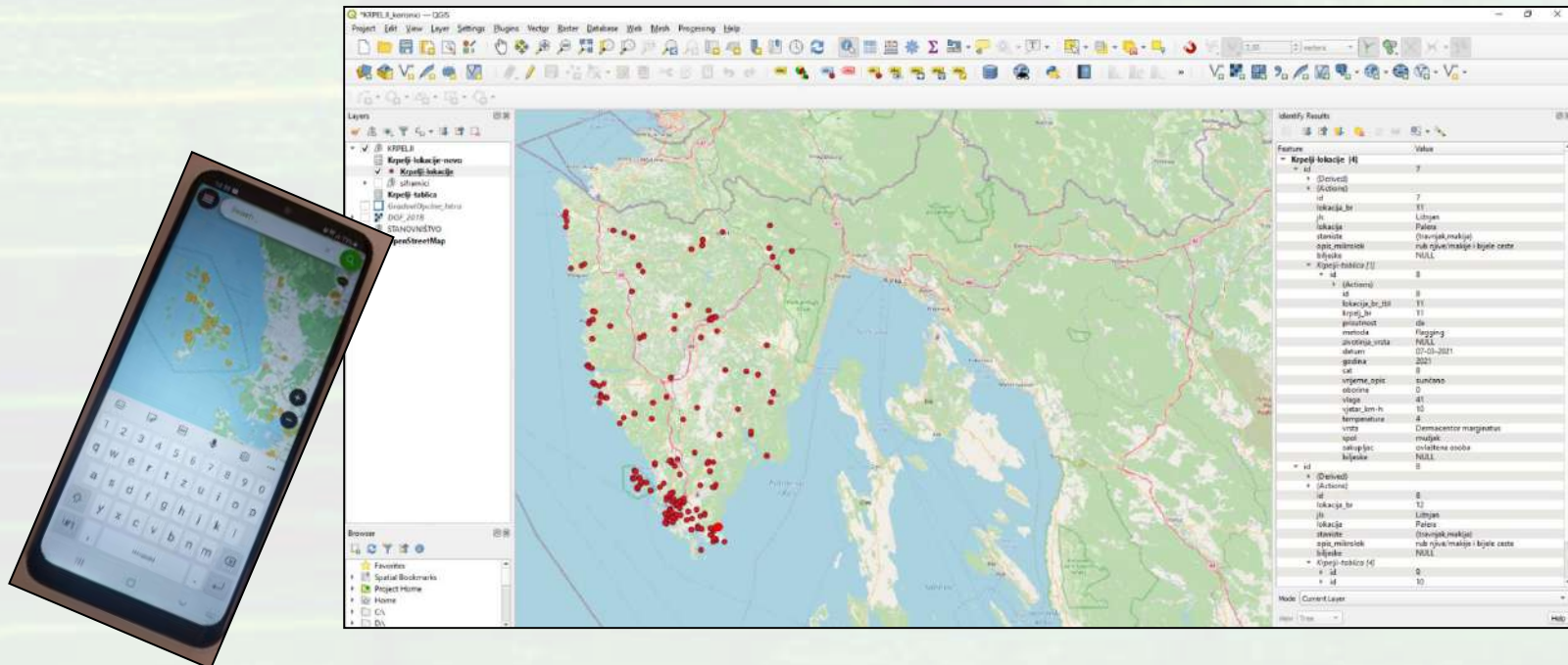
*Would you like to find out where ticks have been collected so far and do they transmit diseases in the area of Istria?*

# CREATION OF GIS DATABASE

## Data collection and analysis

The obtained results were entered into the GIS database

- Mobile Qgis application for field work.
- Qgis desktop application for working in the office.
- **Information requested from hunters, animal owners and citizens:** type of animal, microlocation, date of finding ticks.
- **Collection by Institute employee (flagging/dragging method):** weather conditions, microlocation, habitat, abundance, date of discovery.



On the map: Each collector can see their tick data and TBD data in their environment

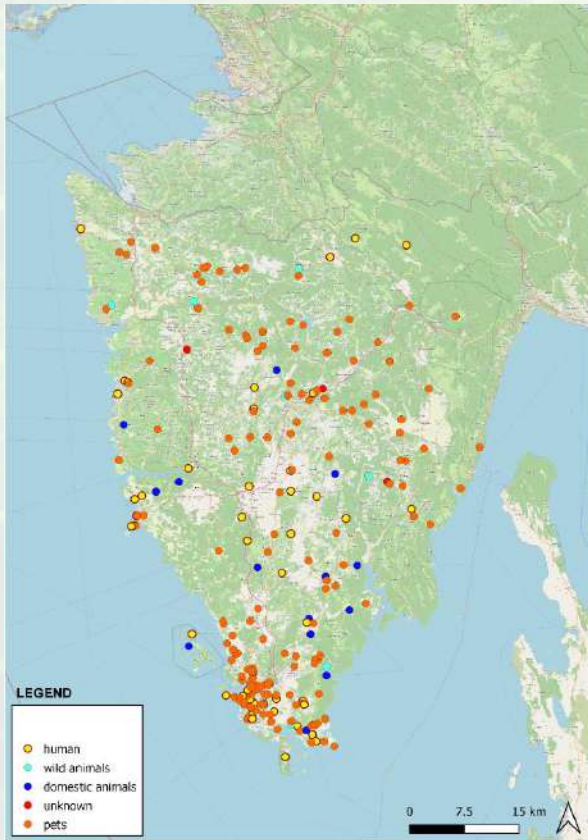
# TICKS AND THEIR HOSTS: BIRDS, REPTILES, LARGE AND SMALL MAMMALS



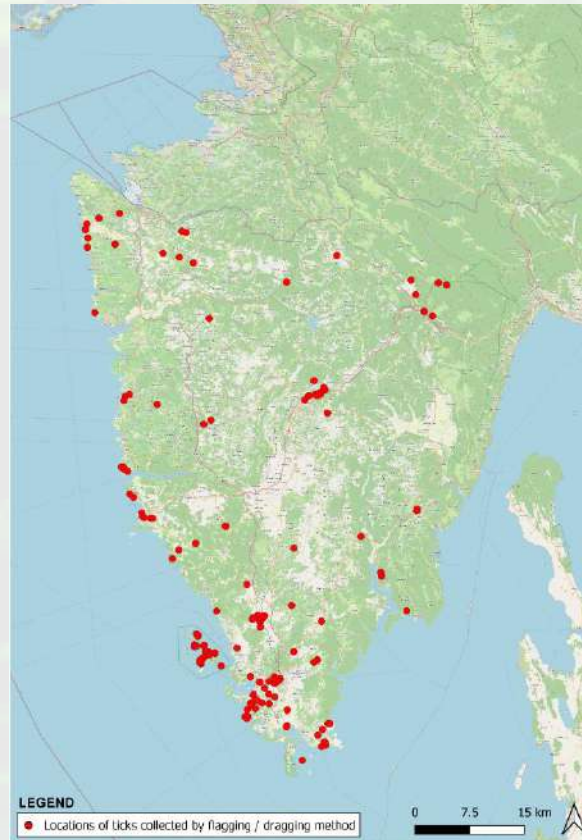
*INTERESTING: all hunters claimed that ticks do not go to wild boars*

# RESULTS

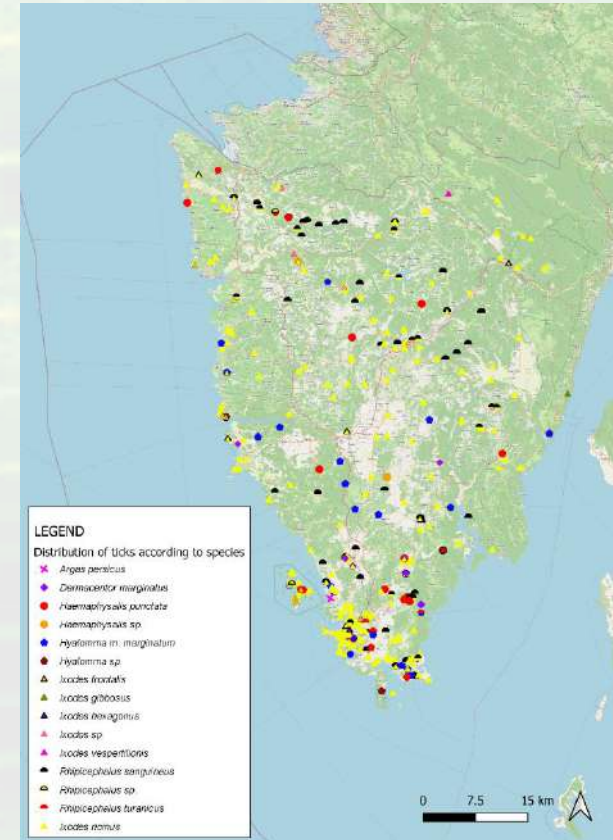
## GIS



Locations of ticks collected from different hosts: humans, wild animals, domestic animals, pets (2020 to 2023)

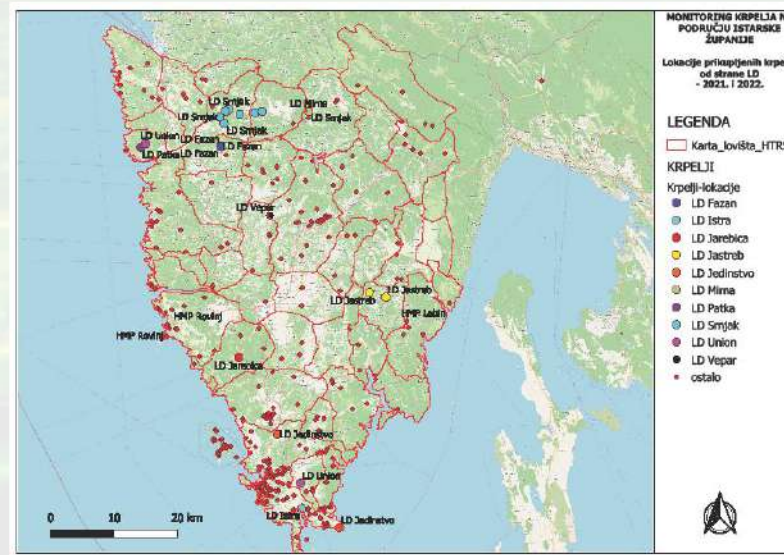


Locations of ticks by flagging / dragging method (2020 to 2023)

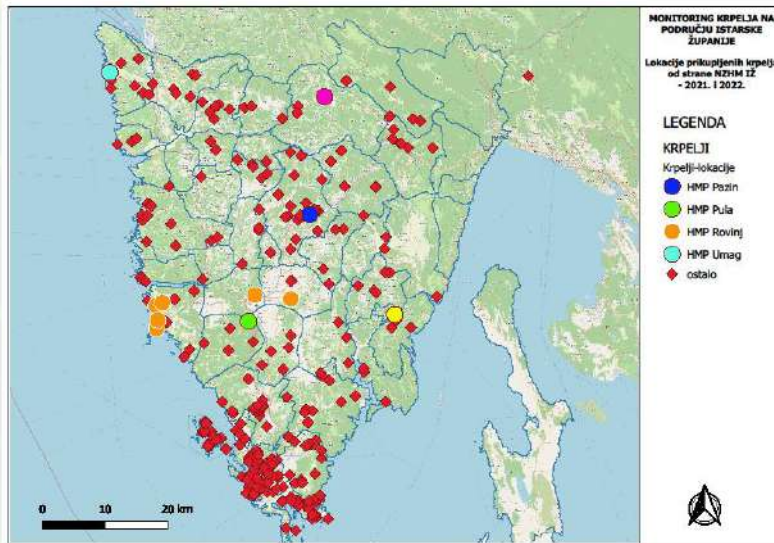


Spatial distribution of tick species in Iстриa collected by flagging and hosts collecting method (2020 to 2023)

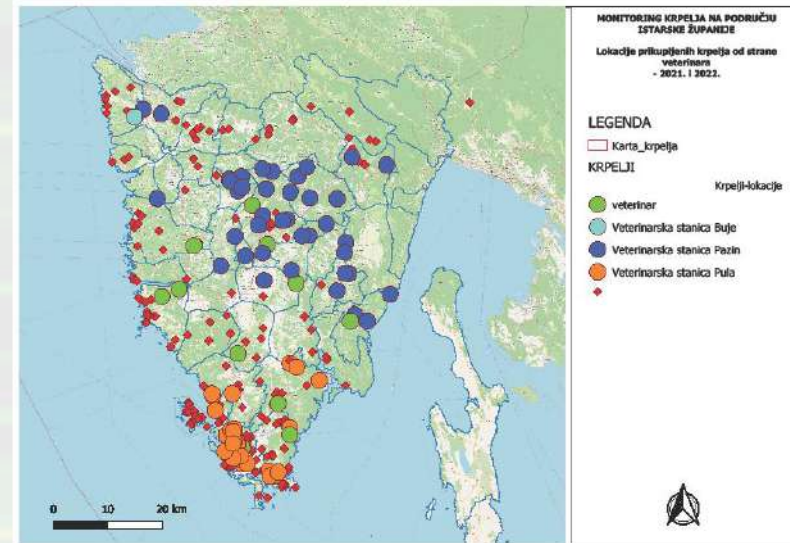
# RESULTS



Locations of ticks collected by hunters



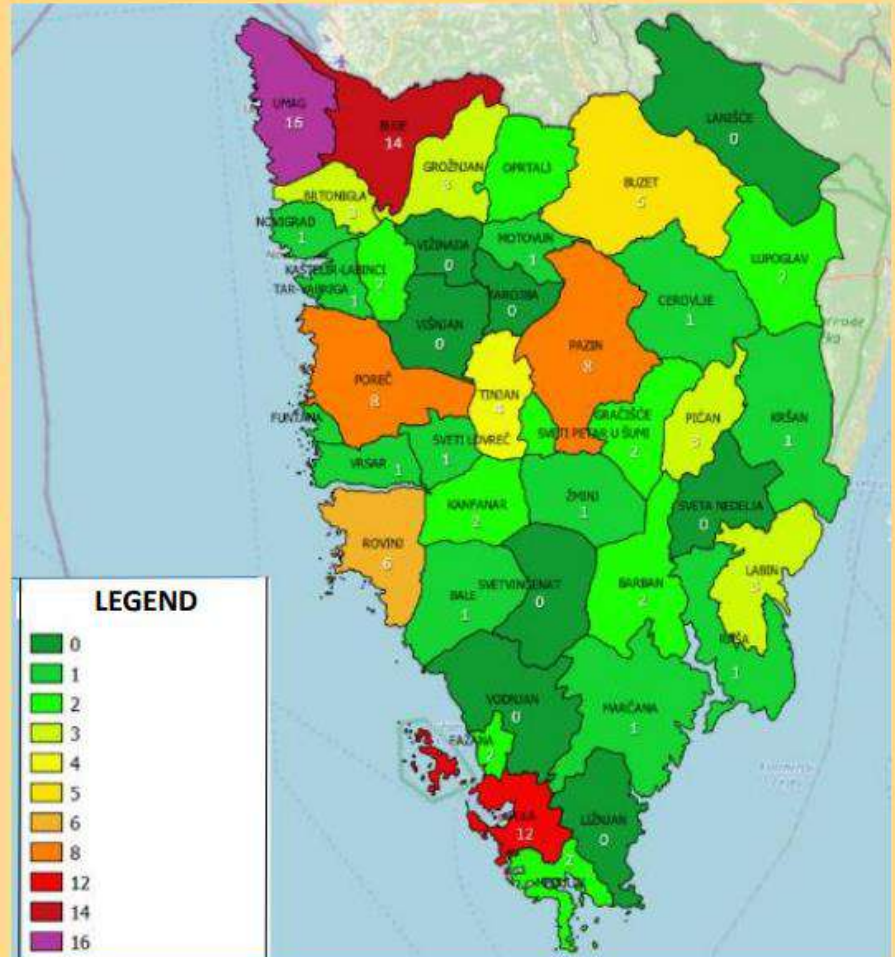
Locations of ticks collected by emergency medical workers



Locations of ticks collected by veterinarians



**Figure 4.** Spatial analysis of zoonoses reported in Istria (2016 - 2023). The disease Lyme borreliosis is significantly predominant (yellow dot)



**Figure 5.** The prevalence of *B. burgdorferi* s.l. extracted from ticks in Istria, distributed by local self-government units. (2016 - 2023)

## HOW TO ATTRACT A PERSON TO COOPERATE

Initial assumption: *as if nobody knows anything about ticks*

### Interest of individuals

There is always someone more / less interested in the group, usually people who are attacked by ticks more often are more interested, pay more attention to them because that person will see the most interest in their engagement.

### Acquiring a person for cooperation - personal contact is important

People feel more important if you address them personally, especially to interested individuals - take your time!

When we manage to get a person to cooperate, it is necessary to adapt to their capabilities and their free time.

Find out and listen to people's problems related to ticks, try to guide them, educate them, help them...

Call them every year and remind them that the tick season is starting.



# PERSONAL ASSESSMENT OF THE PARTICIPANT'S INVOLVEMENT BASED ON EXPERIENCE

involvement	<i>after contacting, those who agreed to participate</i>	
VOLUNTEER ENGAGEMENT	SCORING: from 1 to 5	
contact method	performance evaluation without reminders	performance evaluation with regular communication 1-3 times a year
by telephone	3	4
by personal contact / orally	4	5
website	0	1
lectures	3	4
stands on public areas of cities	0	1
media - feedback	1	2

involvement	<i>after contacting, those who agreed to participate</i>	
PROFESSIONAL ENGAGEMENT	performance evaluation without reminders	performance evaluation with regular communication 1-3 times a year
veterinarians	4	5
doctors	2	3
foresters	0	0
citizens	1	2
hunters	2	3
other NGO	1	1

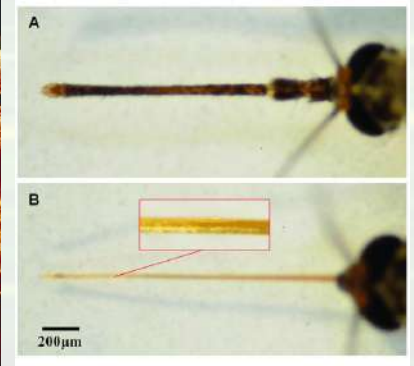
## WE SPOTTED...

### Wrong collection of ticks

- Despite strict oral, written and simple instructions, after we repeat and demonstrate several times how to collect ticks - people collect them again wrong
- lots of leaves of grass in the test tube, it takes time to find ticks and put it out
- a wet piece of cotton wool or a paper towel - if they are too wet, the tick suffocates in the water.

### Wrong removal of ticks

- All the doctors, as well as citizens, removed ticks incorrectly.
- The trick to remember not to rotate tick around: *proboscis is not round in cross-section like a mosquito`s, but straight as a saw and breaks easily.*



### Find light motifs of interested parties

- a woman has problems with her joints, tell her what to do, where to go...
- truffle dogs...

Give them more attention because that person will see the most interest in their engagement

## WE SPOTTED...

- *Even the flagging / dragging method that we implemented - we needed the help of citizens: find local residents, ask them if they know of locations with a higher number of ticks in their surroundings*

### **Do not forget to respond to the citizens**

- If you promised to give feedback, be sure to do it, otherwise, usually they won't want to cooperate anymore.

### **Acquiring a person**

- Be attentive, patient and adaptable, listen to them.

### **Gaps in our approach**

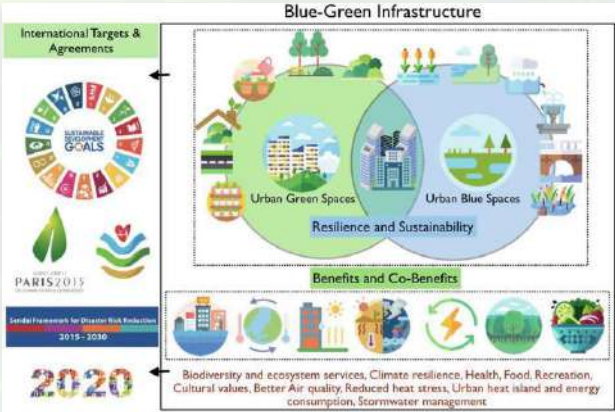
- A full-time persons during the project is necessary.
- People forget about ticks until next year, so it is necessary to call them every year and remind them that the tick season is starting and to ask to collect them again.

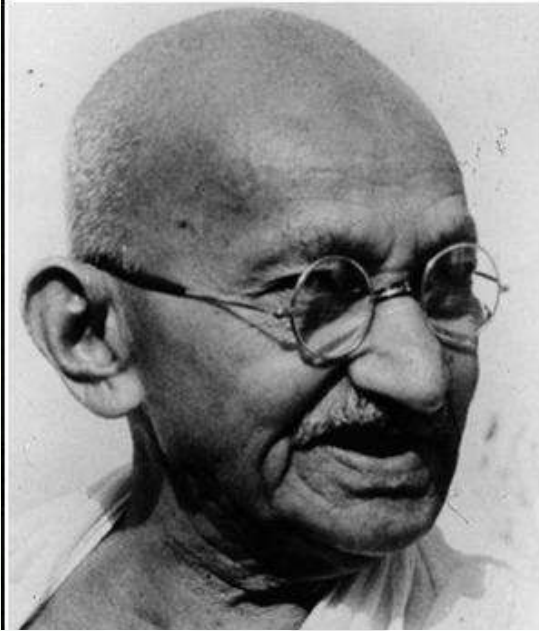
### **HOW THE COVID-19 helped the study:**

- People spent more time in nature...).
- Because of COVID we were disinfecting a lot of different buildings, vehicles, ect. So we had an opportunity to collaborate with lot of individuals, especially medical stuff.

# IDEAS FOR FUTURE... To be more involved in community

Provide recommendations to decision makers regarding the issues of creating habitats that are suitable for mosquitoes and ticks when developing public green and blue infrastructure, e.g. planning and maintaining urban parks and water bodies.





If you don't ask, you don't get it

— Mahatma Gandhi —

