Univerzitet Crne Gore
Biotehnički fakultet

Nadzor nad invazivnim i domaćim vrstama komaraca i patogenima koje mogu prenijeti u Crnoj Gori - akronim LOVCEN

DO SADA URAĐENO

http://project-lovcen.me/index.php

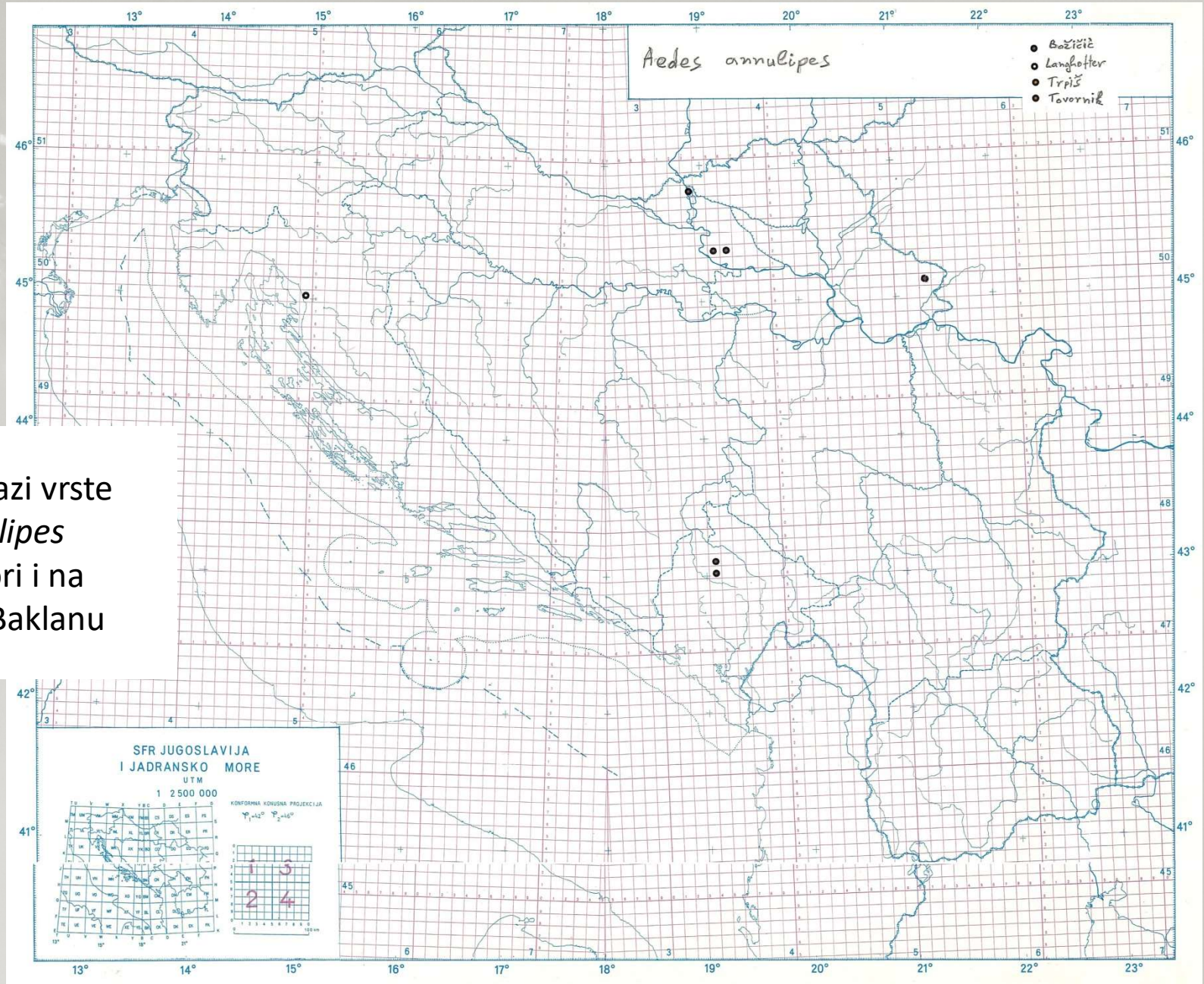
(WP3a) – Nabavka klopki za komarce

http://project-lovcen.me

(WP1a) – Nadzor nad domaćim i invazivnim vrstama komaraca

	historical data – 15 species	2014 – 9 species	2015 – 8 species	2016 – 6 species
1	***Aedes mariae***			TV
2	***Aedes zammitti***			BD
3	***Aedes vexans***			TV, PZ
4	***Aedes echinus***			
5	***Aedes geniculata***			PG, Golubovci, BD, PZ, SN, ZB, MK, KL
6	*Aedes annulipes*	Božičić, ZB		
7	***Aedes caspius***			TV, PG, UL, KO, BD
8	*Aedes cataphylla*	Božičić, ZB		
9	***Aedes communis***			ZB, PV
10	*Aedes detritus*	Božičić, UL		
11	*Aedes pionips*	Božičić, ZB		
12	***Aedes pulcritarsis***			PZ
13	*Aedes pullatus*	Božičić, ZB		
14	***Aedes punctor***			ZB, BA
15	***Aedes cinereus***			PV
16	***Aedes rusticus***			UL, KO
17	***Aedes sticticus***			
18	***Aedes albopictus***			HN, KO, TV, BD, BR, UL, CT, PG, Golubovci, Tuzi, DG, NK, MK, KL, PZ, SN, BP
19	*Anopheles atroparvus*	Vitanović, CT		
20	*Anopheles claviger*	Apfellbeck, HN		
21	*Anopheles hyrcanus*	Božičić, ZB		
22	*Anopheles melanoon*	Di Lucca et al, KO, Golubovci		
23	***Anopheles maculipennis s.l.*** ***Anopheles maculipennis s.s.***			Golubovci, Gusinje, BA
24	*Anopheles messeae*	Vitanović, CT; Vujošević, BR, Golubovci; Di Lucca et al, KO, Golubovci		
25	***Anopheles plumbeus***			DG, UL, KO
26	***Anopheles saccharovi***			UL, Gusinje
27	*Anopheles superpictus*	Apfellbeck, HN, KO, TV; Vujošević, CT, BR		
28	***Coquillettidia buxtoni***			CT, UL, BD, PV, MK, Plav
29	***Coquillettidia richiardii***			Golubovci, DG, CT, UL, BD
30	***Culex hortensis***			PV, BP, Plav, Gusinje
31	***Culex modestus***			
32	***Culex pipiens***			PG, Golubovci, DG, CT, BR, UL, BD, KO, PZ, SN, PV, BP, MK, KL, Andrijevica, Murina, Plav, Gusinje, BA, RO
33	*Culex territans*	Božičić, ZB		
34	*Culex theileri*	Božičić, UL		
35	***Culiseta annulata***			DG, BD, Gusinje, BA, RO
36	***Culiseta longiareolata***			PG, BA
37	*Culiseta morsitans*	Božičić, PZ		
38	*Orthopodomyia pulcripalpis*			

(WP1a) – Nadzor nad domaćim i invazivnim vrstama komaraca



Istorijski nalazi vrste
Ae. Annulipes
u Crnoj Gori i na
zapadnom Baklanu

http://project-lovcen.me

(WP1a) – Nadzor nad domaćim i invazivnim vrstama komaraca

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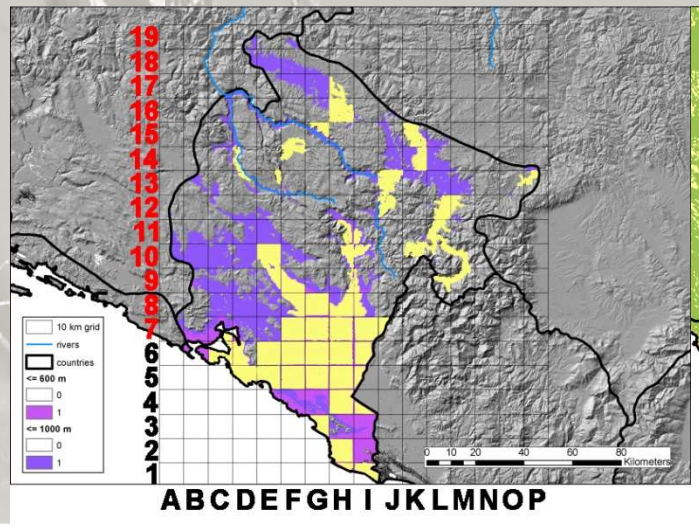
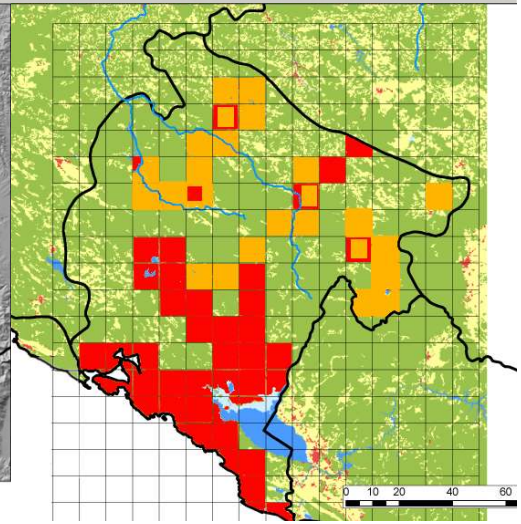
1. *Anopheles maculipennis* (vector of malaria)
2. *An. plumbeus* (vector of malaria)
3. *An. saccharovi* (vector of malaria)
4. *Aedes vexans* (vector of Rift Valley Virus and Celovo Virus)
5. Aedes *echinus*
6. Aedes *caspius* (Rift Valley Virus, *Dirofilaria immitis* and *D. repens*)
7. Aedes *sticticus*
8. A*edes albopictus* (Chicungunia Virus, Dengue Virus, nematodes *Dirofilaria immitis, D. repens*)
9. Aedes *geniculatus*
10. *Aedes zammitti*
11. *Aedes rusticus*
12. *Aedes pulchritarsis*
13. *Aedes punctor*
14. *Aedes communis*
15. *Aedes cinereus*
16. *Culex modestus* (West Nile Virus, *Dirofilaria immitis* and *D. repens*)
17. *Culex pipiens* (West Nile Virus, Sindbis virus, Rift Valley Virus, *Dirofilaria immitis* and *D. repens*)
18. *Culex hortensis*
19. *Culiseta annulata*
20. *Culiseta longiareolata*
21. *Coquillettidia richiardii*
22. *Coquillettidia buxtoni*
23. *Culicoides* sp. (Blue Thong Virus)
24. Phlebotominae (*Laishmania* spp. vectors)
25. Simulidae

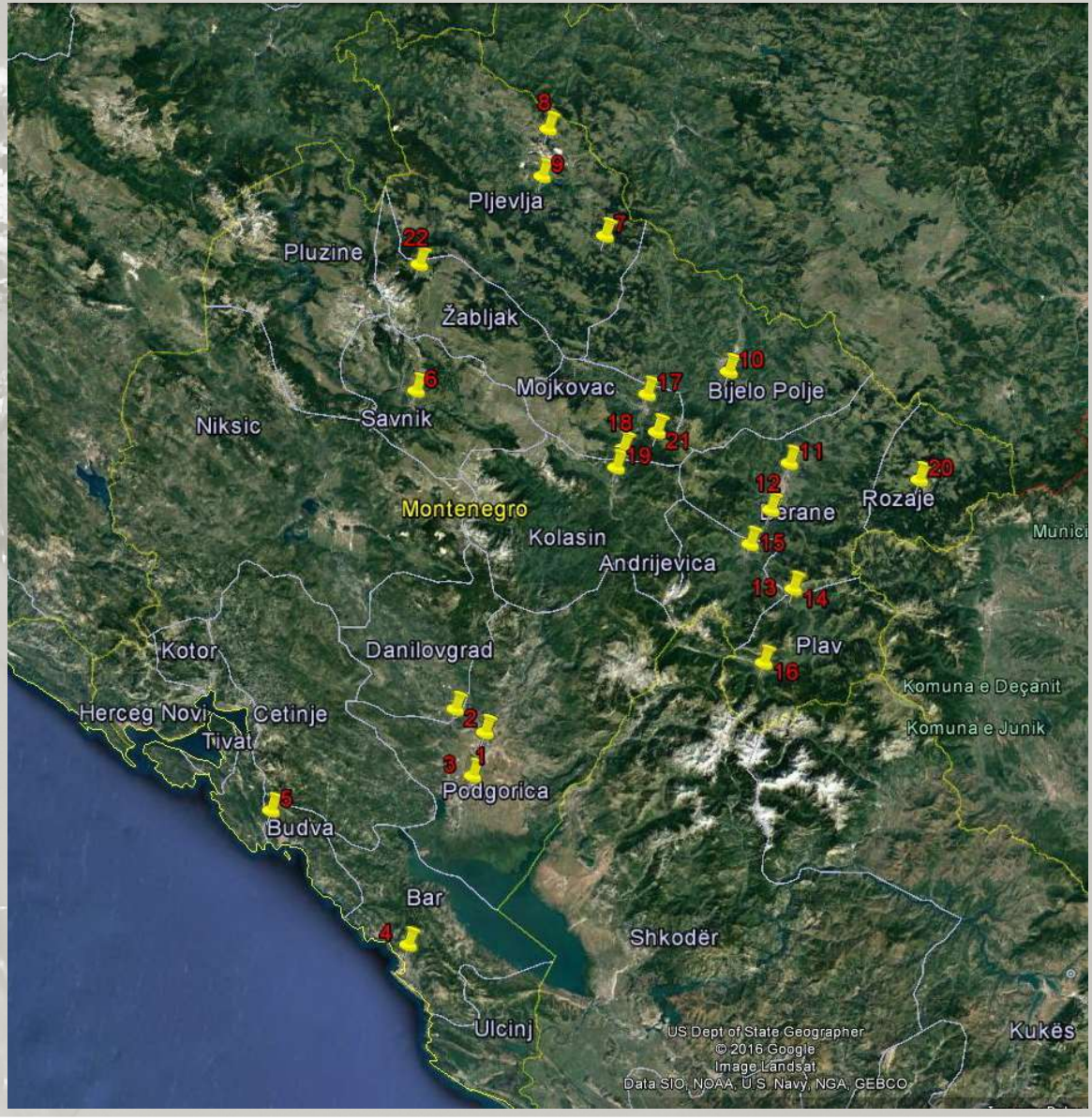




(WP1a) – Nadzor nad domaćim i invazivnim vrstama vektora

Ažuriranje faune Simulida (BLACKFLY) u Crnoj Gori, mjesta uzorkovanja

No.	WATER COURSE	LOCALITY	Altitude (m)
1	Morača	Podgorica	40
2	Mareza	Podgorica	30
3	Cijevna	Podgorica	19
4	Željeznica	Bar	**12**
5	Smokvica	Lastva Grbaljska	35
6	Komarnica	Šavnik	822
7	Ćehotina	Vrulja	953
8	Breznica	Pljevlja	773
9	Vezišnica	Vilići	798
10	Lim	Ribarevine	581
11	Lim	Berane	664
12	Lim	R. Maresnica	709
13	Lim	Murino	831
14	Murinska rijeka	Murino	838
15	Zlorečica	Andrijevica	751
16	Alipasha`s springs	Gusinje	927
17	Tara	Mojkovac	807
18	Tara	Kolašin	894
19	Plasnica	Bakovići	932
20	Ibar	Rožaje	1045
21	brook	Bjelasica mt.	1148
22	Mlinski potok	Durmitor mt.	**1444**



Adriatic see basin (16th -21st May , 2015)

Black see basin (June 23rd -July 2nd, 2016)

Lake confluents (August 16th 2016)

(WP1a) – Nadzor nad domaćim i invazivnim vrstama vektora

P. latimucro (Enderlein, 1925)
P. rufipes (Meigen, 1830) complex
S. bertrandi Grenier & Dorier, 1959
S. brevidens (Rubtsov, 1956)
S. ornatum Meigen, 1818 (complex)

S. rubzovianum (Sherban, 1961)
S. angustitarse (Lundström, 1911)
S. costatum Friederichs, 1920
S. *cryophilum* (Rubtsov, 1959) (complex)
S. argenteostriatum Strobl, 1898
S. bezzii (Corti, 1914) (complex)
S. degrangei Dorier & Grenier, 1960
S. intermedium Roubaud, 1906
S. reptans (Linnaeus, 1758)
S. argyreatum Meigen, 1838
S. variegatum Meigen, 1818
S. balcanicum (Enderlein, 1924)
S. equinum (Linnaeus, 1758)
S. lineatum (Meigen, 1804)
S. pseudequinum Séguy, 1921

(WP1a) – Nadzor nad domaćim i invazivnim vrstama vektora

Sandfly (or **sand fly**) is a colloquial name for flying, biting, blood-sucking dipterans (fly), vectors of Leishmania.

Members of the family Ceratopogonidae, also known as **no-see-um** (**no-see-em**, **noseeum**), or may refer to members of the subfamily Phlebotominae.

Phlebotomus neglectus
P. tobbi
P. simici
P. balcanicus
Sergentomyia minuta

Bull's-eye rash (*Erythema migrans*) on a patient with Lyme disease.

(WP3a) – Nabavka ostale opreme

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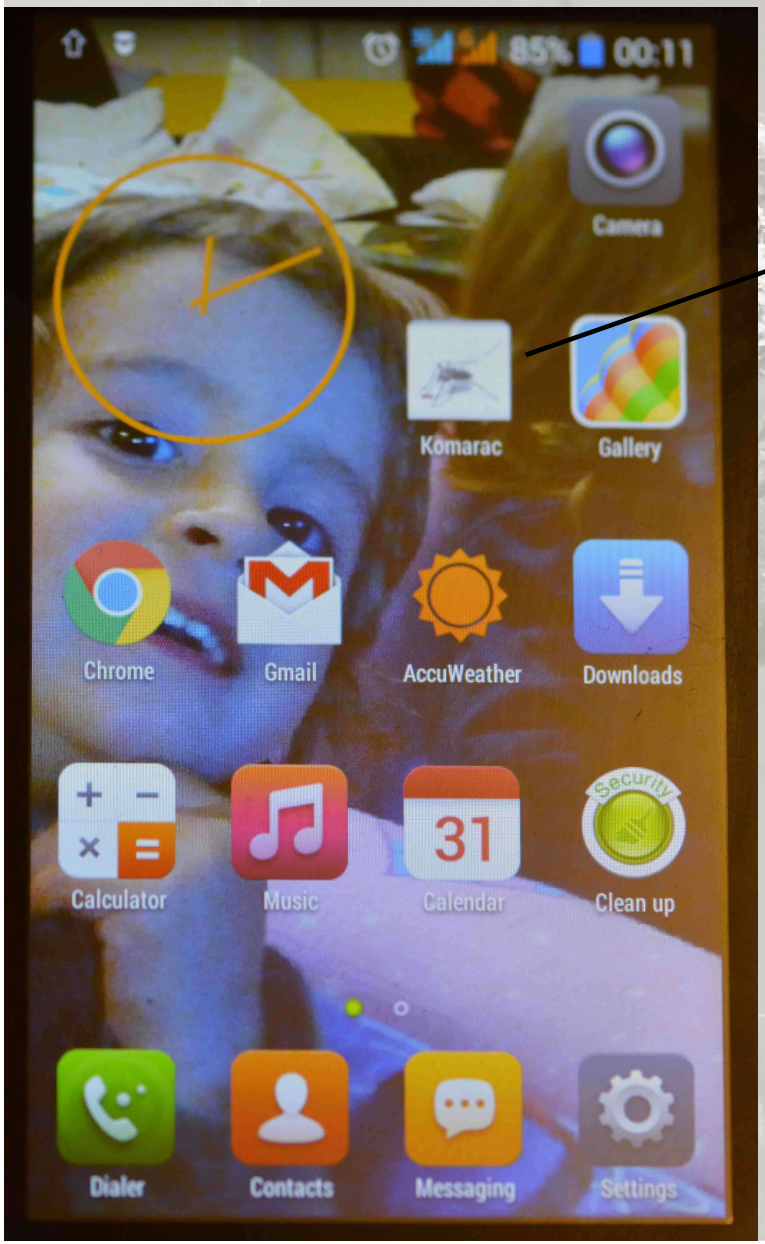
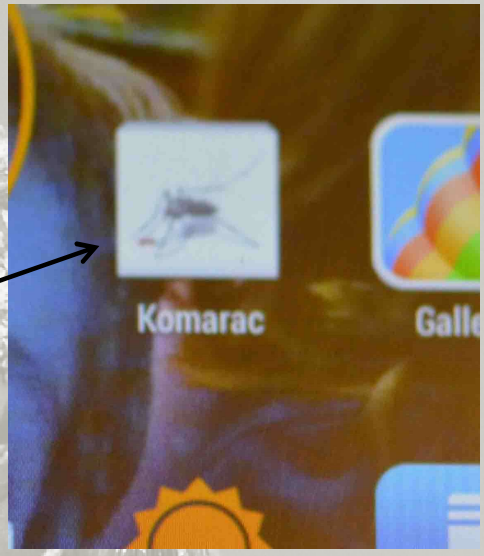
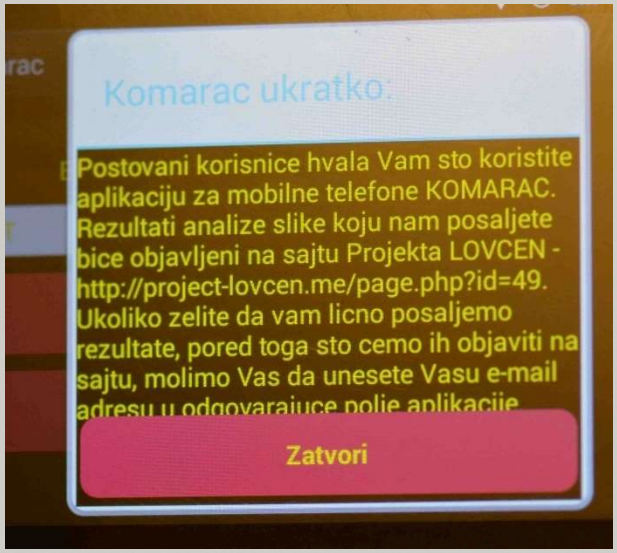
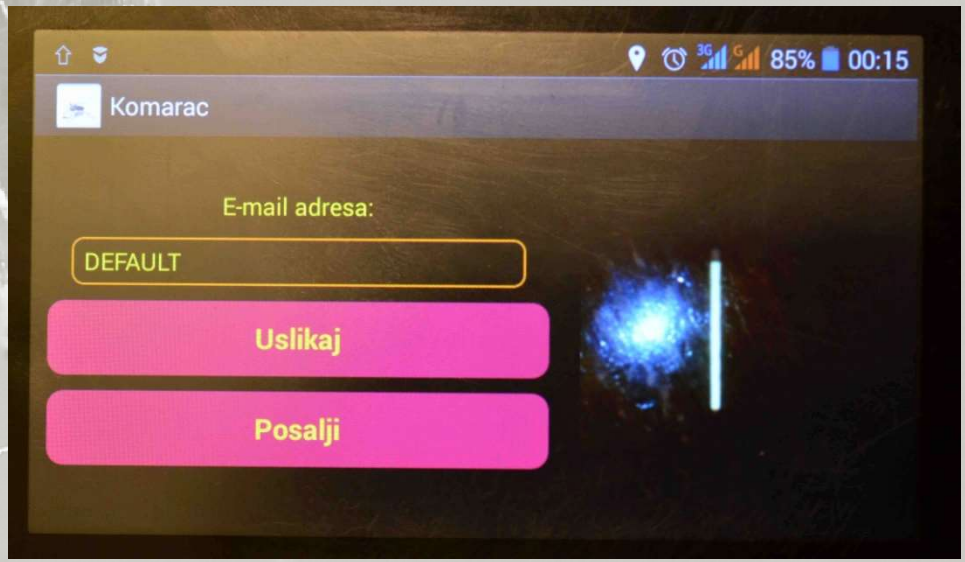
Aedes vittatus
Aedes albopictus
Aedes aegypti
Anopheles maculipennis
Aedes geniculatus
Culex pipiens

(WP1b) – Aplikacija za mobilne telefone za nadzor nad komarcima (KOMARAC)









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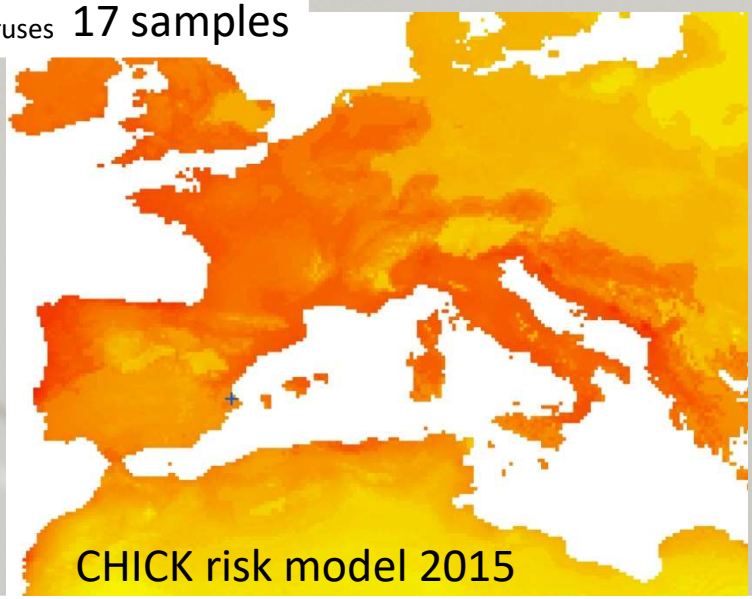
(WP1c) – Detekcija patogena u komarcima i ljudima

Date	Sample	Place	Specie	N°	Cod.Pool	Molecular reseach*	Date of analysis
05-06.07.2014	1/1	Tolosi 2	*Cx.pipiens*	5	M1	negative to all	7/23/2013
05-06.07.2014	1/2	Tolosi 2	*Ades spp.*	1	M2	negative to all	7/23/2013
05-06.07.2014	2	Stara Varos	*Cx.pipiens*	3	M3	negative to all	7/23/2013
06-07. 07.2014	3	Mataguzi	*Cx.pipiens*	4	M4	negative to all	7/23/2013
06-07. 07.2014	4/1	Gornja Gorica	*Cs.longiarolata*	1	M5	negative to all	7/23/2013
06-07. 07.2014	4/2	Gornja Gorica	*Cx.pipiens*	6	M6	negative to all	7/23/2013
06-07. 07.2014	4/3	Gornja Gorica	*Culex spp.*	1	M7	negative to all	7/23/2013
07-08. 07.2014	5	Tolosi 1	*Cx.pipiens*	5	M8	negative to all	7/23/2013
08-09. 07.2014	6	Donja Gorica	*Cx.pipiens*	2	M9	negative to all	7/23/2013
08-09. 07.2014	7/1	Zlatica	*Oc. Caspius*	1	M10	negative to all	7/23/2013
08-09. 07.2014	7/2	Zlatica	*Cx.pipiens*	10	M11	negative to all	7/23/2013
08-09. 07.2014	7/3	Zlatica	*Culex spp.*	2	M12	negative to all	7/23/2013
09-10. 07.2014	8/1	Donji Bandici	*Cx.pipiens*	1	M13	negative to all	7/23/2013
09-10. 07.2014	8/2	Donji Bandici	*Culex spp.*	1	M14	negative to all	7/23/2013
09-10. 07.2014	9	Gornji Bandici	*Culex spp.*	1	M15	negative to all	7/23/2013
10-11. 07.2014	10	Centar	*Cx.pipiens*	2	M16	negative to all	7/23/2013
10-11. 07.2014	11	Preko Morace	*Cx.pipiens*	1	M17	negative to all	7/23/2013

2014

* Pan-flavivirus, Pan-bunyavirus, Pan-phlebovirus, Pan-alphavirus , West Nile and USUTU viruses 17 samples

48 saples of the human sera, found negative, were tested on anti WN, IgM and IgG antibodies		
Borrelia burgdorferi	840 IgG ELISA tests	59 positive
Borrelia burgdorferi	838 IgM ELISA tests	79 positive
Borrelia burgdorferi	76 Real-Time PCR tests	all negative
Leishmania spp.	22 microscopy	all negative
Leishmania donovani	143 IgG ELISA tests	10 positive
Plasmodium spp.	14 microscopy	all negative
Lyme boreliosis	1990 samples	6 reports of disease
Leishmaniasis		3 reports of disease
Infectio West Nile		no registered cases
Malaria		no registered cases



(WP1c) – Detekcija patogena u komarcima i ljudima

	Samples 2015	Flavivirus, Bunyavirus, Alphavirus , Phlebovirus (viral genus PCRs), West Nile , USUTU (specific Real Time PCRs)									
No	locality	GPS	date	trap	species	sex	no.	dry ace	Cod. POOL	darwin	camp.
3			17.05.		*Culex pipiens*	ž	4	yes	**M1**	197163	1
5	Mataguži	42.321792, 19.283035	17.05.	BG	*Culex pipiens*	ž	10	yes	M2	197163	2
10	Lug - Jasen dalje od kucice		17.05.	NS2	*Culex pipiens*	ž	2	yes	M3	197163	3
14	Lug- pokošena livada		17.05.	NS2	*Culex pipiens*	ž	3	yes	M4	197163	4
18	Lug - kod kućice		17.05.	NS2	*Culex pipiens*	ž	1	yes	M5	197163	5
22	Anđušići pored BG	42.333503, 19.241560	17.05.	NS2	*Culex pipiens*	ž	2	yes	M6	197163	6
26	Anđušići u bagrenju	42.333571, 19.242351	17.05.	NS2	*Culex pipiens*	ž	9	yes	M7	197163	7
64	Cetinje Bajice	42.400572, 18.897384	19.05.	NS2	*Culex pipiens*	ž	1	yes	M8	197163	8
66					*Culex pipiens*	ž	3	yes	**M9**	197163	9
69	Bar - Stara maslina	42.080208, 19.130197	20.05.	NS2	Culex pipiens	ž	1	yes	M10	197163	10
73	Solana Ulcinj	41.917927, 19.249858	20.05.	NS2	*Culex pipiens*	ž	50	yes	M11	197163	11
83					*Coquillettidia buxtoni*	ž	50	yes	M12	197163	12
84					*Coquillettidia buxtoni*	ž	1	yes	M13	197163	13
85					*Culex pipiens*	ž	14	yes	M14	197163	14
86					*Coquillettidia buxtoni*	ž	33	yes	M15	197163	15
92					*Coquillettidia buxtoni*	ž	50	yes	M16	197163	16
94	Lastva 1 tresnja	42.306016, 18.794303	21.05.	NS2	*Culex pipiens*	ž	1	yes	M17	197163	17
99					Culex pipiens	ž	5	yes	M18	197163	18
102					*Coquillettidia buxtoni*	ž	1	yes	M19	197163	19
107	Jaz 8 kod prve prodaje	42.284273, 18.804771	21.05.	NS2	*Culex pipiens*	ž	2	yes	M20	197163	20
109	Lastva Grbaljska 3	42.306130, 18.794827	21.05.	NS2	*Culex pipiens*	ž	5		M21	197163	21
112	Jaz 7 Dule pored kafane	42.282032, 18.801440	21.05.	NS2	*Culex pipiens*	ž	15	yes	M22	197163	22
115					*Coquillettidia buxtoni*	ž	1	yes	M23	197163	23
117	Jaz 4 u trsci	42.281555, 18.800195	21.05.	NS2	*Culex pipiens*	ž	25	yes	M24	197163	24
119					*Coquillettidia buxtoni*	ž	53	yes	M25	197163	25
122					*Coquillettidia buxtoni*	ž	2	yes	M26	197163	26
125	Kneta	41.905308, 19.310662	20.05.	NS2	*Cx. pusillus*	ž	22	yes	M27	197163	27
126					Culex pipiens	ž	26	yes	M28	197163	28

M1 and **M9** are with positive reaction only for Bunyavirus , but with "not specific" results **392** **speciments** **samples 28**

(WP1d) – Sociološka istraživanja

		reg	Municipality	Citizens			Touristic operators	Institutions	
				plan	done	rest			
1	Andrijevica	N	no	70/70	70	0	-	+	
2	Bar	S	no	70/70	70	0	1/3.	+	
3	Berane	N	no	70/70	70	0	-	+	+
4	Bijelo Polje	N	yes	70/70	70	0	-	+	
5	Budva	S	yes	70/70	70	0	7./7.	+	
6	Cetinje	C	yes	70/70	70	0	-	+	+
7	Danilovgrad	C	yes	70/70	70	0	-	+	
8	Golubovci	C	yes	70/70	70	0	-		
9	Gusinje	N	no	21/70	21	49	-		
10	Herceg Novi	S	no	70/70	70	0	0/5	+	
11	Kolasin	N	yes	70/70	70	0	-	+	
12	Kotor	S	no	70/70	70	0	0/1	+	+
13	Mojkovac	N	no	70/70	70	0	-	+	
14	Niksic	C	yes	70/70	70	0	0/1		
15	Petnjica	N	yes	70/70	70	0	-		
16	Plav	N	no	10/70.	30	40	-	+	
17	Pluzine	N	yes	70/70	70	0	-		
18	Pljevlja	N	yes	70/70	70	0	-	+	
19	Podgorica	C	yes	70/70	70	0	4/7.	+	+
20	Rozaje	N	yes	70/70	70	0	-		
21	Savnik	N	no	30/30	30	0	-		
22	Tivat	S	yes	70/70	70	0	0/1	+	
23	Tuzi	C	yes	70/70	70	0	-		
24	Ulcinj	S	no	70/70	70	0	0/4	+	
25	Zabljak	N	yes	21/70	43	27	0/1		
			15-25	1710	1594	116	12/30.	20	

27.11.2016.		done		*rest*	
	total	number	%	*number*	*%*
municipalities	**25**	**15**	60	***10***	*40*
citizens	**1710**	**1594**	93.22	***116***	*6.78*
t. operators	**30**	**12**	40	***18***	*60*
institutions	**30**	20	66.67	***10***	*33.33*

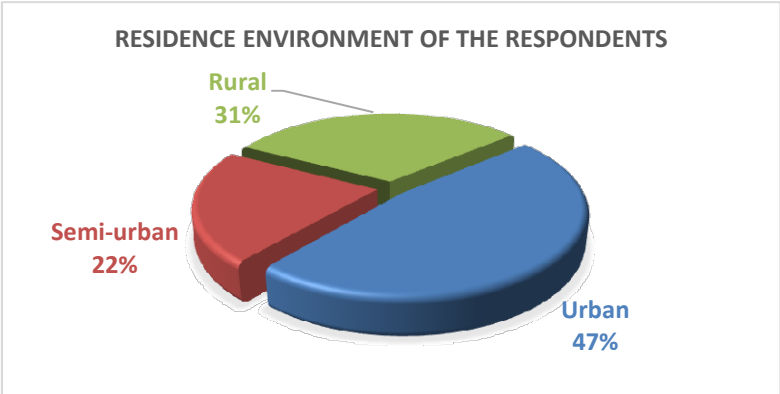
suma	**suma**
1795	**1641**

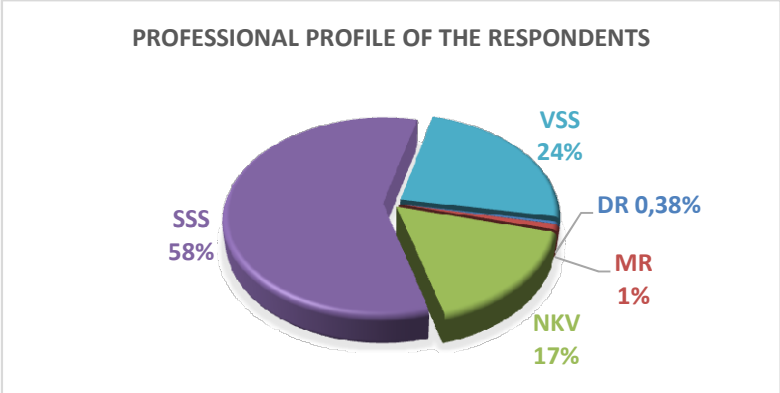
91.42% **in total**

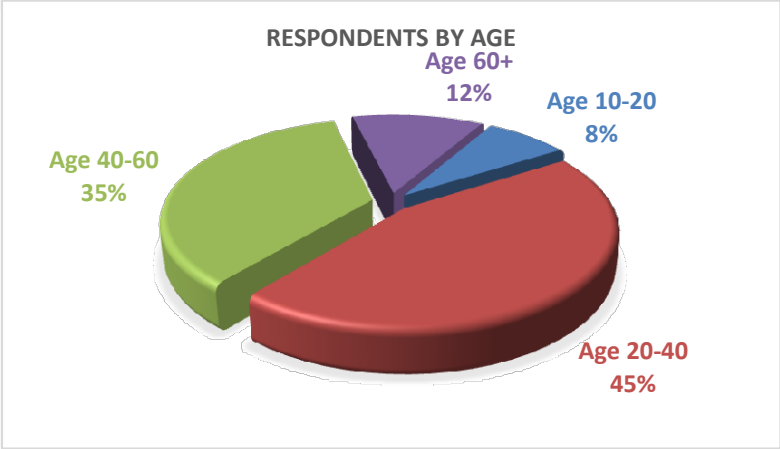
Healt care institutions

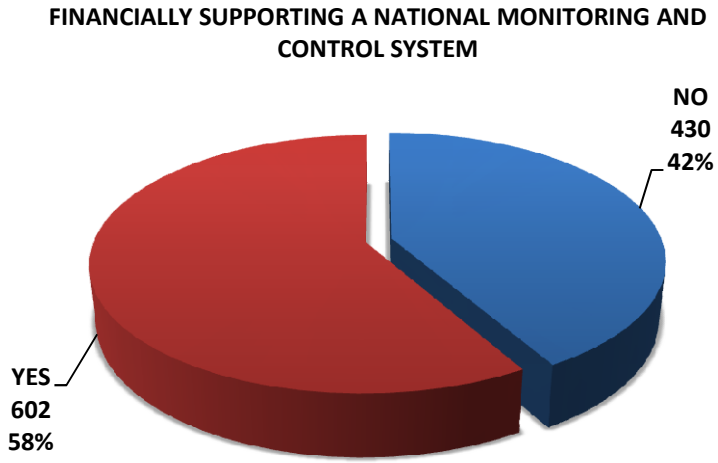
18 community healt centers
7 hospitals
3 specialized hospitals
2 institutes

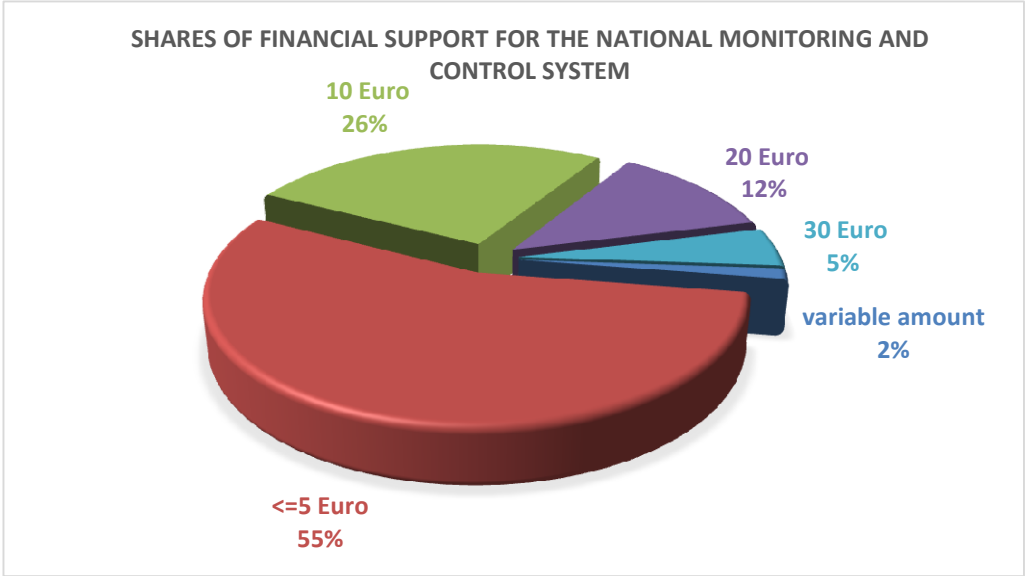
Σ 30


RESIDENCE ENVIRONMENT OF THE RESPONDENTS
Rural
31%
Semi-urban
22%
Urban
47%

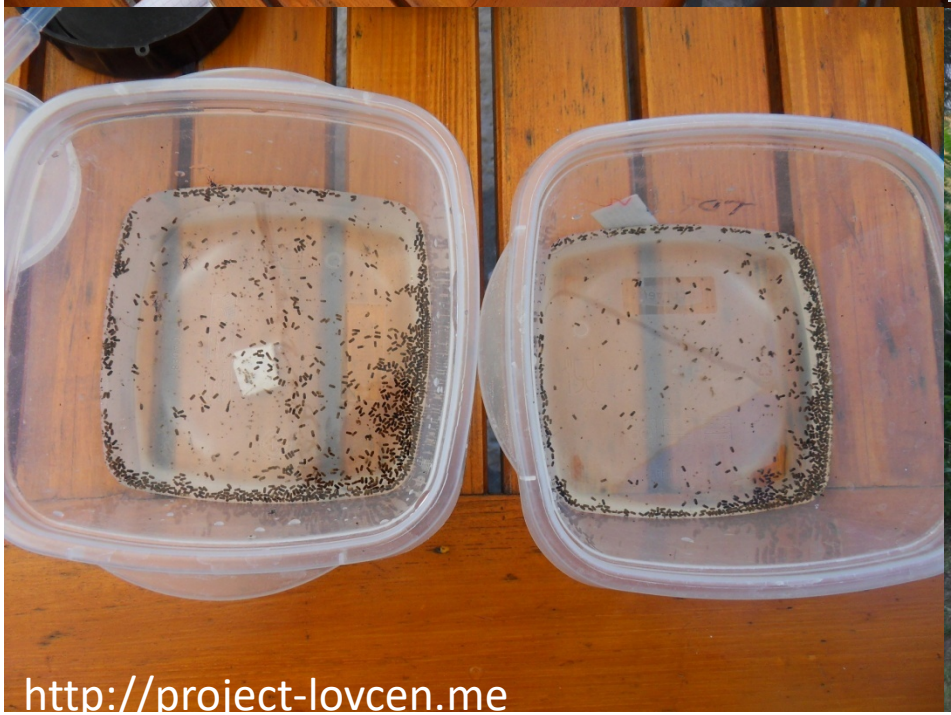

PROFESSIONAL PROFILE OF THE RESPONDENTS
VSS
24%
DR 0,38%
MR
1%
NKV
17%
SSS
58%


RESPONDENTS BY AGE
Age 60+
12%
Age 10-20
8%
Age 40-60
35%
Age 20-40
45%


FINANCIALLY SUPPORTING A NATIONAL MONITORING AND CONTROL SYSTEM
NO
430
42%
YES
602
58%


SHARES OF FINANCIAL SUPPORT FOR THE NATIONAL MONITORING AND CONTROL SYSTEM
10 Euro
26%
20 Euro
12%
30 Euro
5%
variable amount
2%
<=5 Euro
55%

(WP1e) - SIT i druge nepesticidne mjere kontrole



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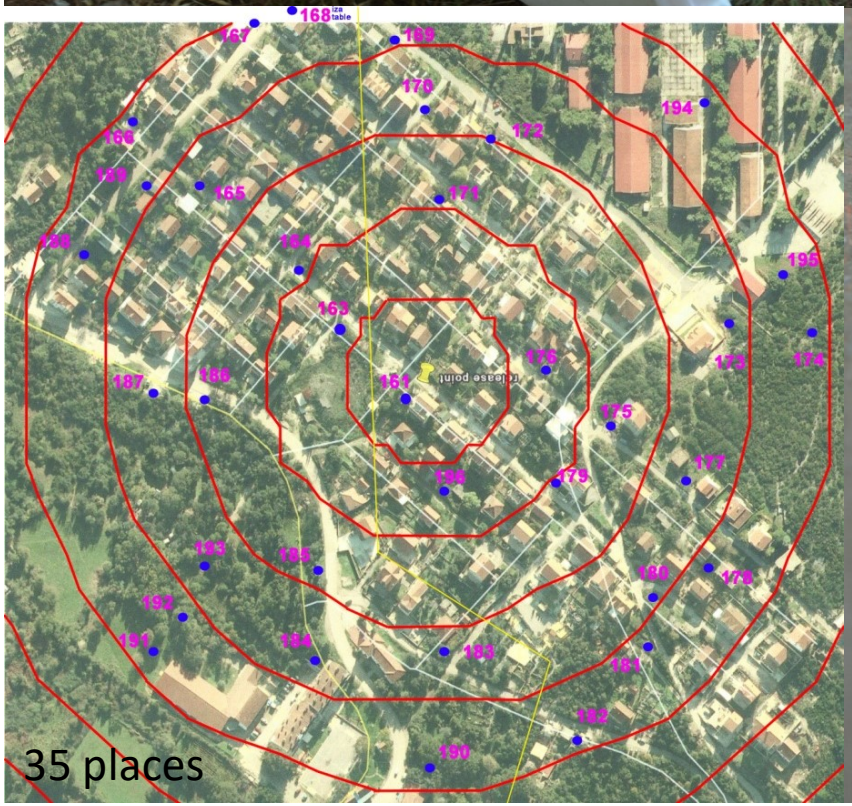
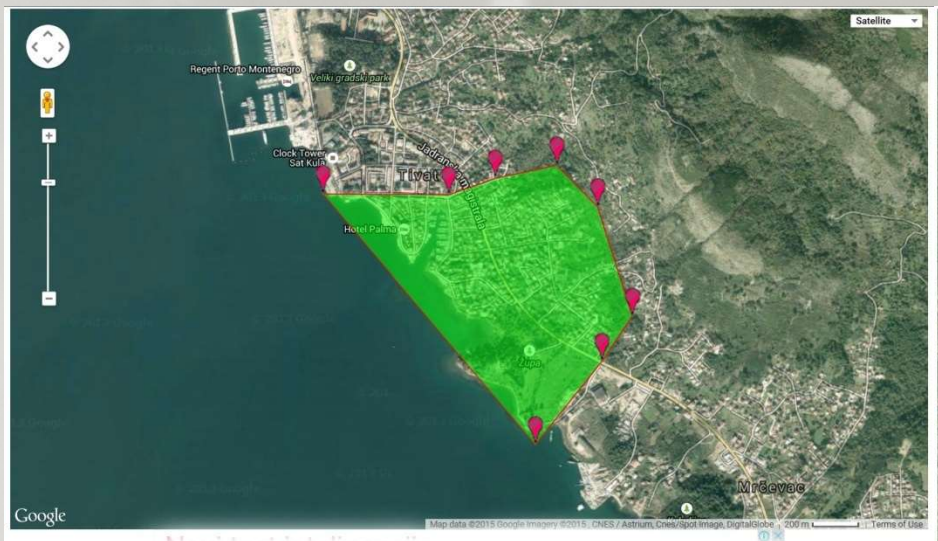

35 places

http://project-lovcen.me

http://project-lovcen.me

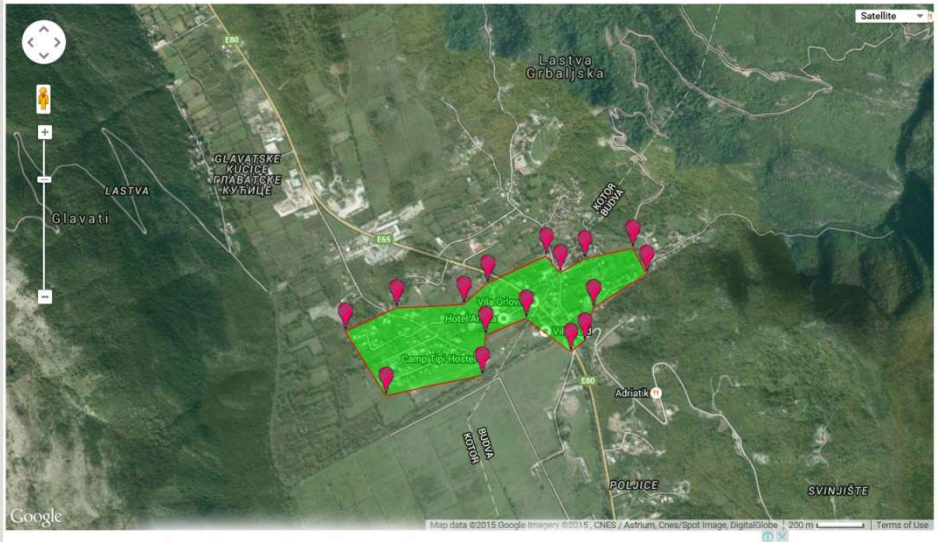
(WP1e) - SIT i druge nepesticidne mjere kontrole

Procjena rizika od širenja Chikungunya, Dengue and Zika virusa u Crnoj Gori 2015



Tivat - 73.57 ha

Radovici - 20.73 ha



Lastva Grbaljska - 30.21 ha

Results:
The *Ae. albopictus* population density may support outbreak of Chikungunya A226V, Chikungunya and Dengue viruses.
<u>A preliminary estimation indicates that also Zika virus may be able to produce outbreak in case of introduction.</u>

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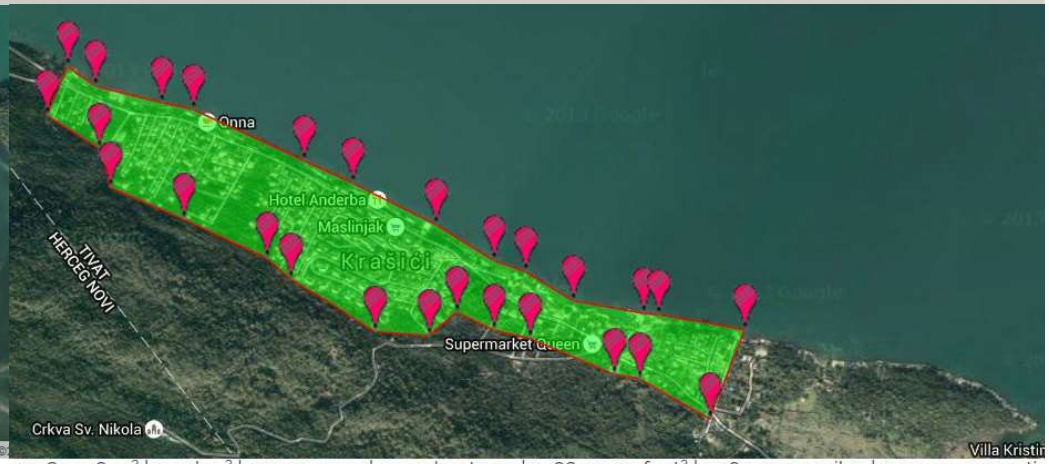
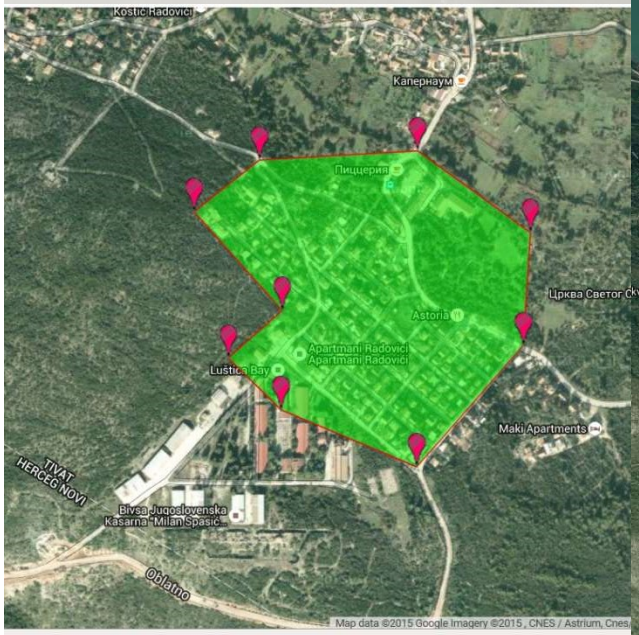
(WP1e) - SIT i druge nepesticidne mjere kontrole

Procjena rizika od širenja Chikungunya, Dengue and Zika virusa u Crnoj Gori 2016

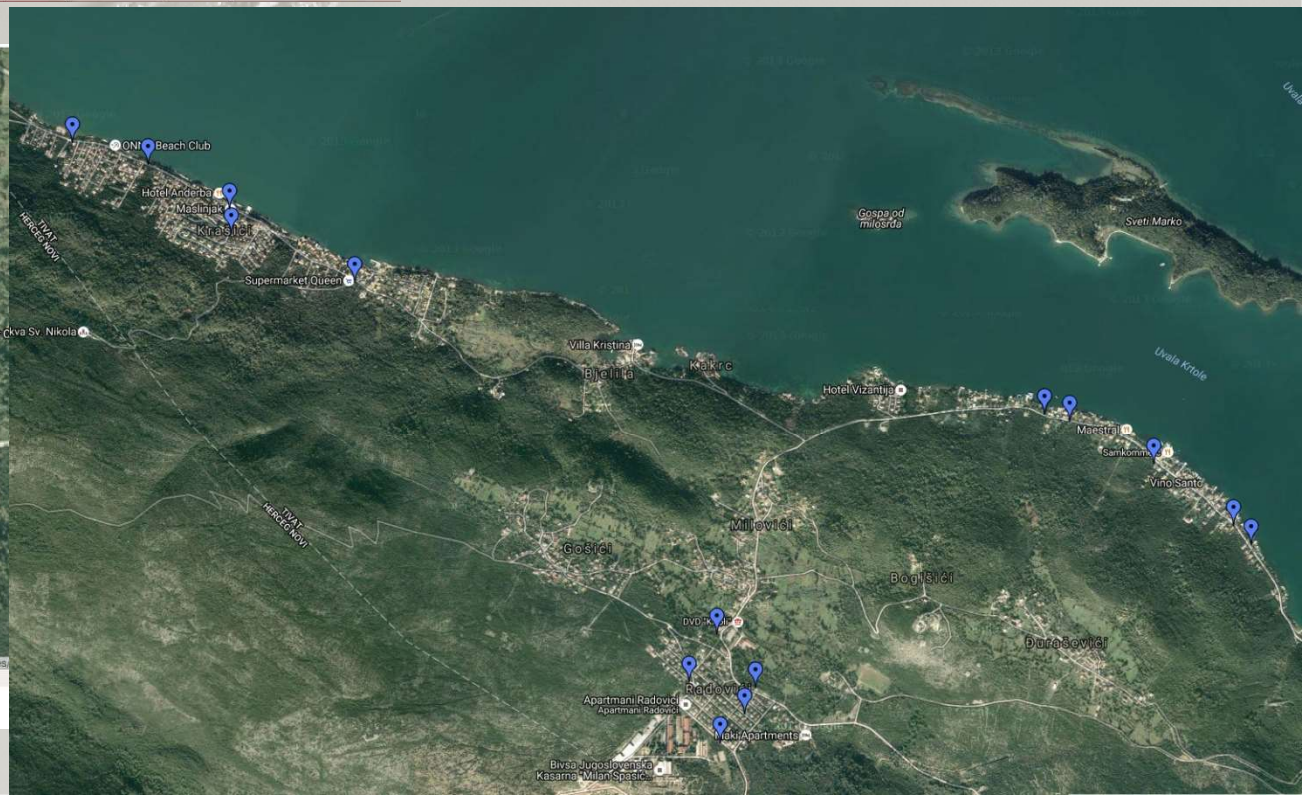
282007.11 m² | 0.28 km² | 69.69 acres | 28.20 hectares | 3035499.29 feet² | 0.11 square miles | 0.08 square



405855.48 m² | 0.41 km² | 100.29 acres | 40.59 hectares | 4368592.03 feet² | 0.16 square miles | 0.12 square nautic



Radovici - 20.73 ha



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(WP1e) - SIT i druge nepesticidne mjere kontrole

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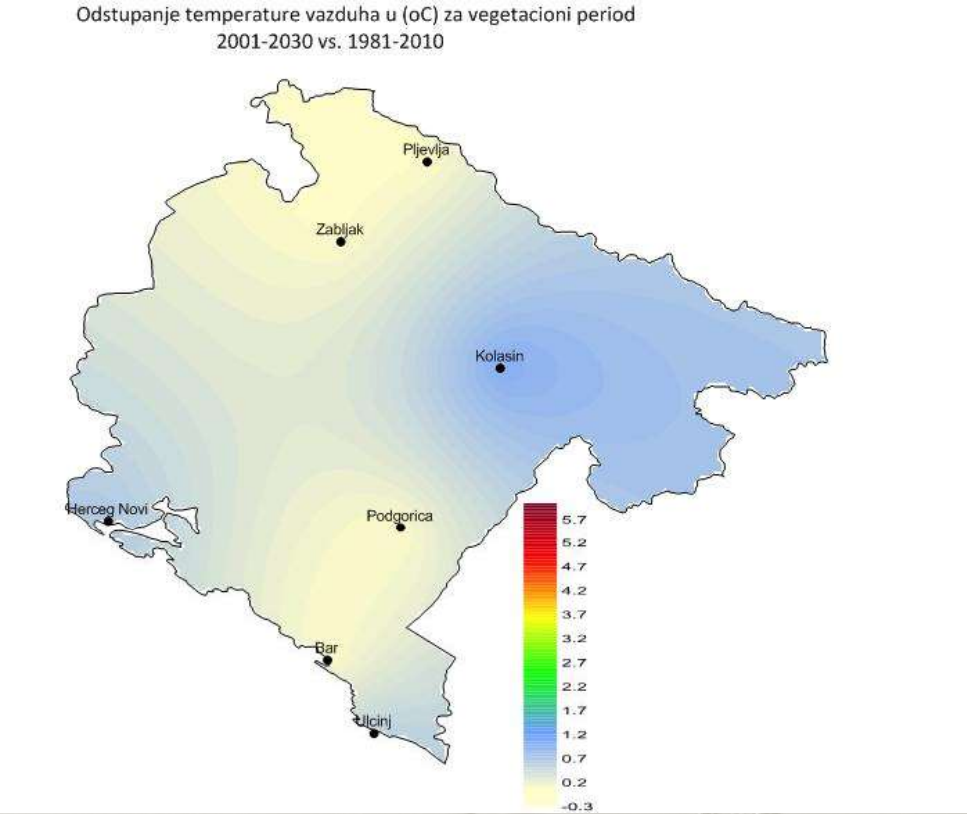
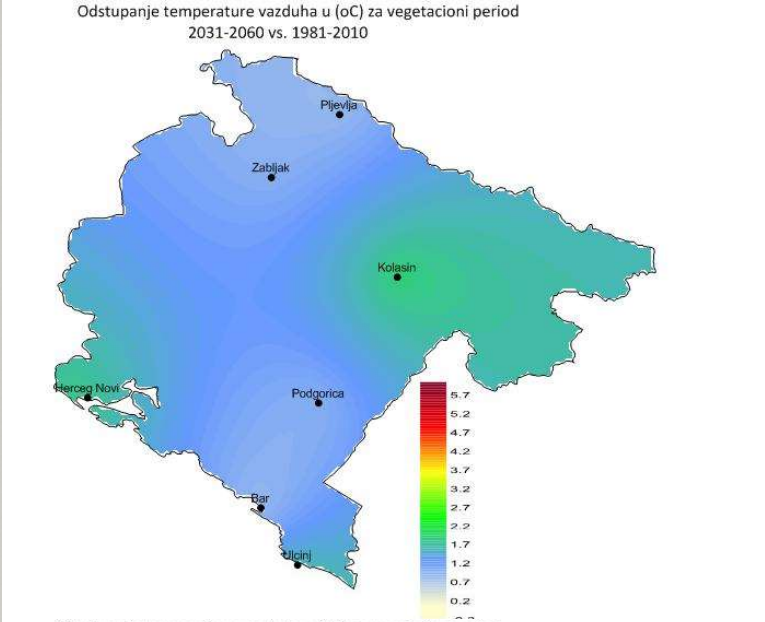
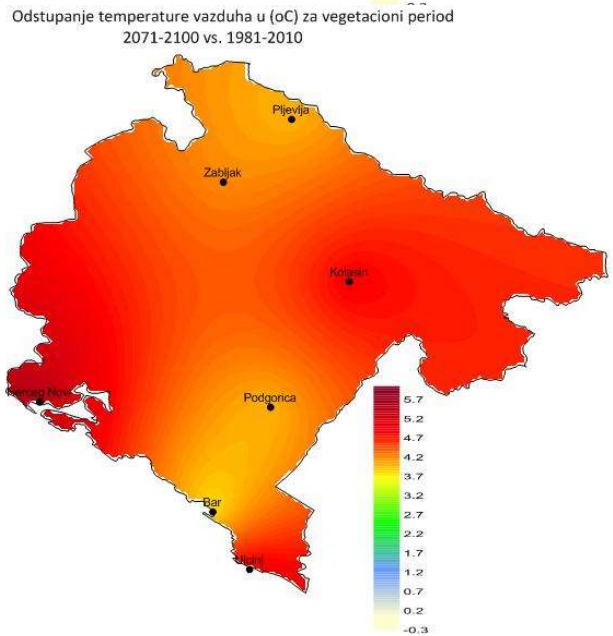
(WP1e) - SIT i druge nepesticidne mjere kontrole

(WP1e) - SIT i druge nepesticidne mjere kontrole

(WP1f) Klimatske promjene i njihov uticaj







Deviation of air temperature during vegetation period (April-September) in respect to 1981-2010 referent period

- for 2001-2030
- for 2031-2060
- for 2071-2100

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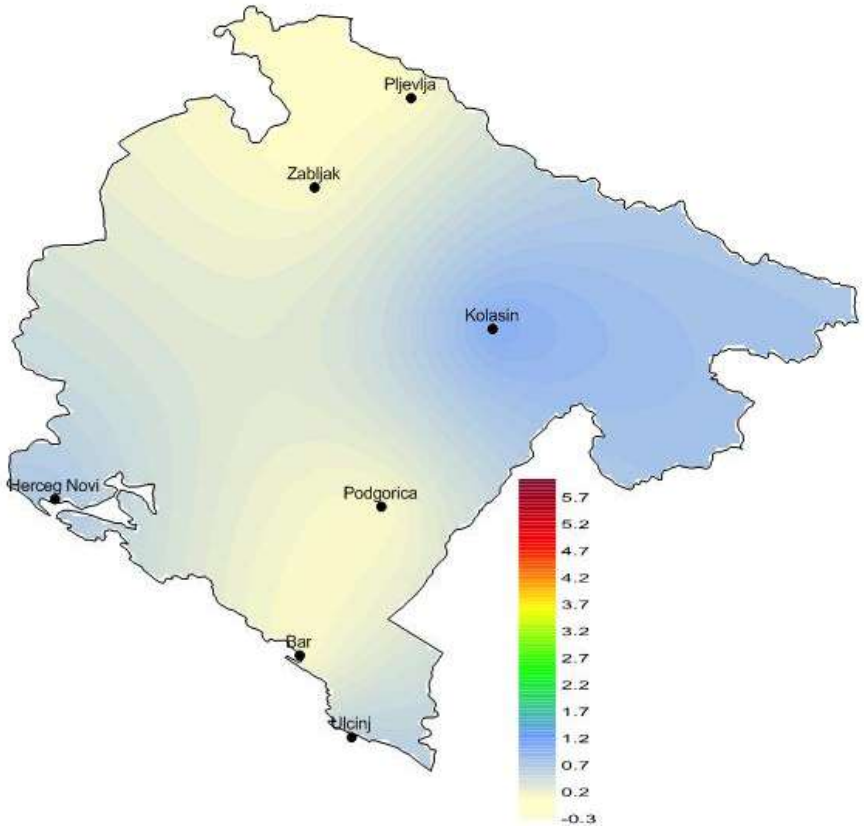
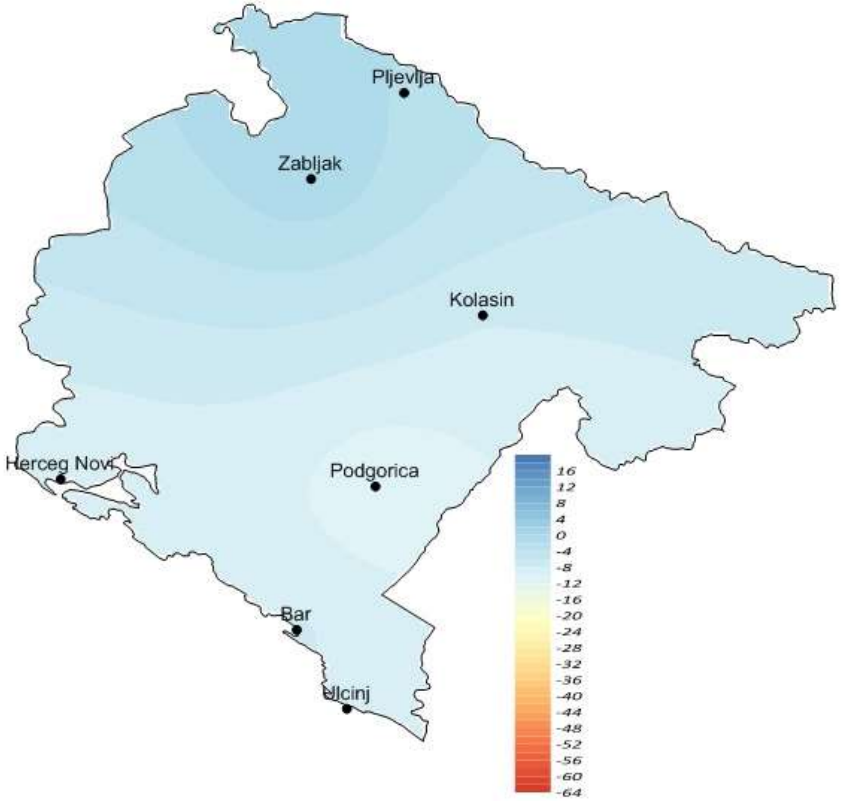
(WP1f) Klimatske promjene i njihov uticaj

Odstupanje temperature vazduha u (oC) za vegetacioni period
2001-2030 vs. 1981-2010

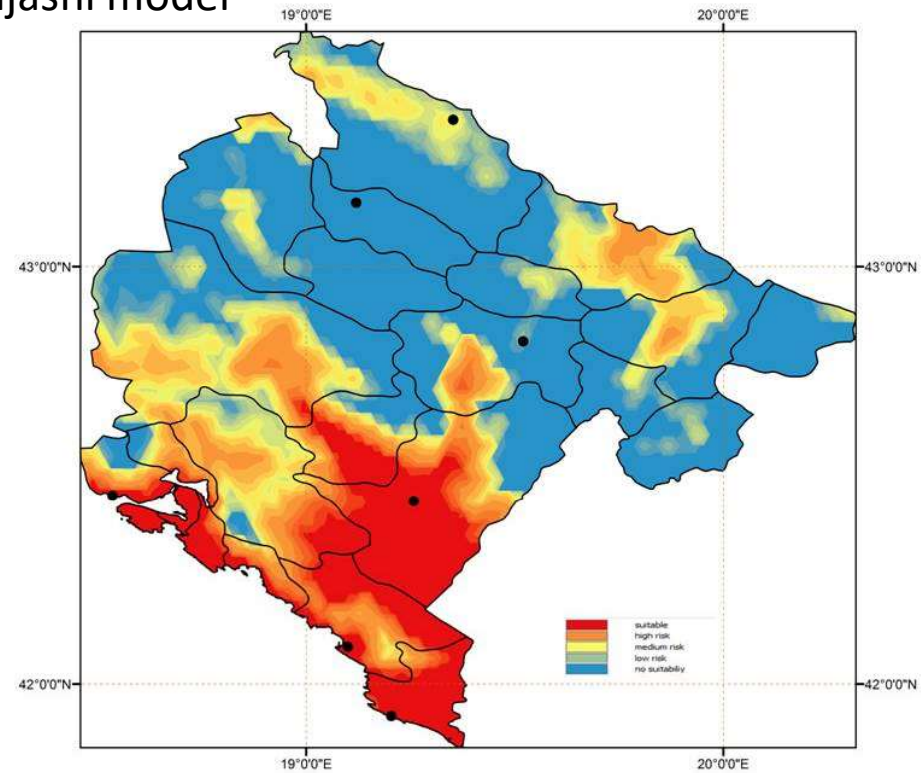


Odstupanja kolicine padavina (%) za vegetacioni period A_O
2001-2030 vs. 1981-2010

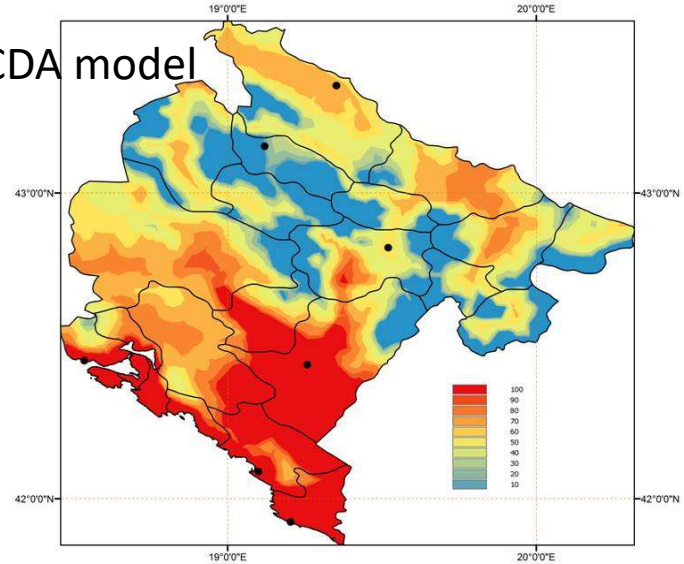


(WP1f) Klimatske promjene i njihov uticaj

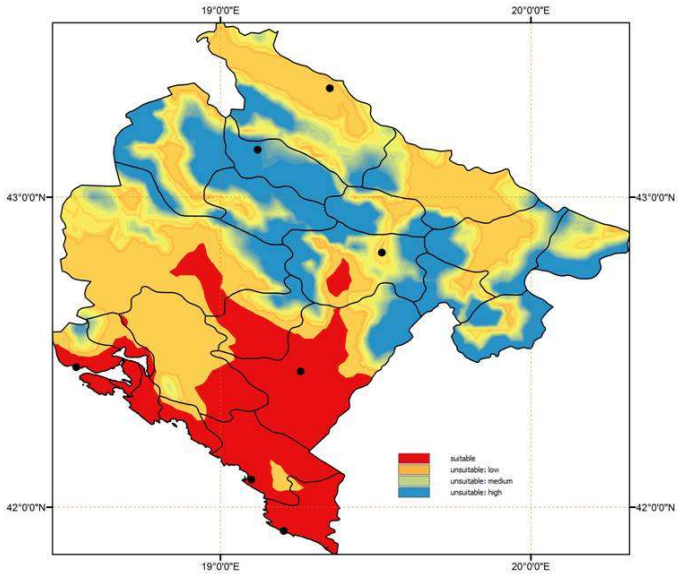
Kobajashi model



MCDA model



prezimljavanje *Ae. albopictus*



Climatic conditions
vs
establishment of *Aedes albopictus*
for Montenegro period 1981-2010

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(WP2a) – Traininzi istraživača iz Crne Gore međunarodnim partnerskim institucijama

(WP2b) - Know-how posjete istraživača iz Crne Gore partnerskim institucijama

(WP2c) – Posjete istraživača iz međunarodnih partnerskih institucija institucija Crnoj Gori

UKUPNO – 27 mobilnosti uključeno 57 osoba

Kick off meeting 02-04. Jun2014. - 4 predstavnika međunarodnih partnerskih organizacija

1. Godišnji skup 13-15. Maj 2015 - 7 predstavnika međunarodnih partnerskih organizacija

2. Godišnji skup 10-13. Maj 2016 - 4 predstavnika međunarodnih partnerskih organizacija

Prvi trening kurs o medicinskoj entomologiji (MediLabSecure).
FoA, Novi Sad, 8-12 Jun 2015 . – 2 mlada istraživača su bila na treningu

MASTER STUDIJE BILJNA PROIZVODNJA - ZAŠTITA BILJA-

I SEMESTAR

Red. Broj	PREDMETI (puni naziv)	FOND ČASOVA			Broj ECTS kredita
		Predav.	Vježbe	Labor.	
1.	Bolesti ratarsko-povrtarskih kultura	4		2	7
2.	Štetočine ratarsko-povrtarskih kultura	4		2	7
3.	Viroze biljaka	3		2	6,5
4.	Urbana zoologija	2	1	1	5,5
5.	Izborni predmet (grupa A)	2		1	4
	UKUPNO	**15**	**1**	**8**	**30**

II SEMESTAR

Red. Broj	PREDMETI (puni naziv)	FOND ČASOVA			Broj ECTS kredita
		Predav.	Vježbe	Labor.	
1.	Štetočine voćaka i vinove loze	4		2	7
2.	Bolesti voćaka i vinove loze	4		2	7
3.	Sredstva za zaštitu bilja	2		2	5
4.	Akarologija	2		2	6
5	Biocidi	2		2	5
	UKUPNO	**14**		**10**	**30**

III SEMESTAR

Red. Broj	PREDMETI (puni naziv)	FOND ČASOVA			Broj ECTS kredita
		Predav.	Vježbe	Labor.	
1.	Bakterioze biljaka	2		1	4
2.	Nematologija	2		1	4
3.	Tehnologija zaštite bilja	3		2	7
4.	Ekotoksikologija i zaštita životne sredine	2		1	4
5.	Sertifikacija sjemenskog i sadnog materijala	4		2	7
	Izborni predmet (grupa B)	2		1	4
	UKUPNO	**15**		**8**	**30**

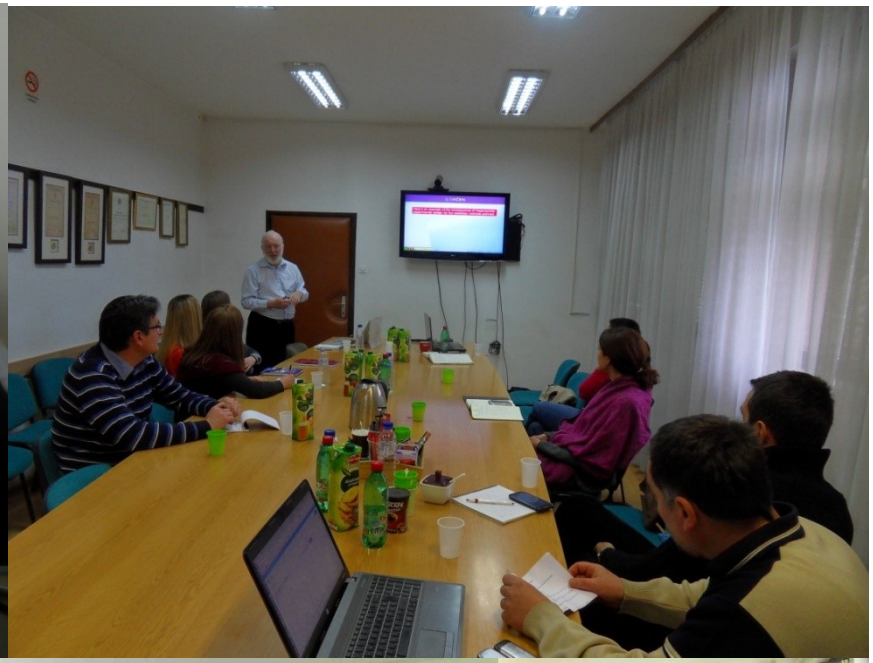
(WP2e) – Uvođenje izučavanja i predavanja o vektorima i njima prenosivim bolestima na UCG/BTF

Projekat LOVCEN je napravio kontakt ili postao partner sa:

1. European Network for Neglected Vectors and Vector-Borne Infections (**EurNegVec**) - COST Action TD1303.;
2. **MediLabSecure** European project (2014-2017) aiming to provide collective responses of viral diseases (respiratory virus and arboviruses) in the Mediterranean and Black Sea regions (19 non-EU countries);
3. **VectorNet** is the European network for sharing data on the geographic distribution of arthropod vectors, transmitting human and animal pathogens, funded both by the European Centre for Disease Prevention and Control (Stockholm, Sweden) and the European Food and Safety Authority (Parma, Italy);
4. **TEMPUS IV** Project: *Lifelong Learning for sustainable agriculture in Alps-Danube-Adriatic region*, **LifeADA** 544585-TEMPUS-1-2013-HR-TEMPUS-JPHESDA.
5. Lecture at **MediPIET** – Presentation of Project achievements - at Course of MEDITERRANEAN PROGRAMME FOR INTERVENTION EPIDEMIOLOGY TRAINNING - MediPIET, Introductory course in intervention epidemiology, 19-30th October, 2015, Budva, Montenegro
6. **"LIFE CONOPS" project** (LIFE12 ENV/GR/000466) is funded by the European Commission in the framework of the programme LIFE + Environment Policy and Governance. Partners from 2015.

Multi Country - Workshop u Bruselu; prvi “Head of Laboratory” skup u Pasterovom institutu u Parizu; skup u Bihacu i Mostaru u BiH; na UCG, CANU, Otvorenim danima nauke, ….

INSTITUT ZA JAVNO ZDRAVLJE
u misiji očuvanja i
unaprijeđenja
zdravlja
stanovništva
Crne Gore



University of Montenegro

Biotechnical faculty

UCG
Univerzitet Crne Gore

LOVCEN

Surveillance of invasive and native mosquito vectors and pathogens they transmit in Montenegro

HVALA
na pažnji

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