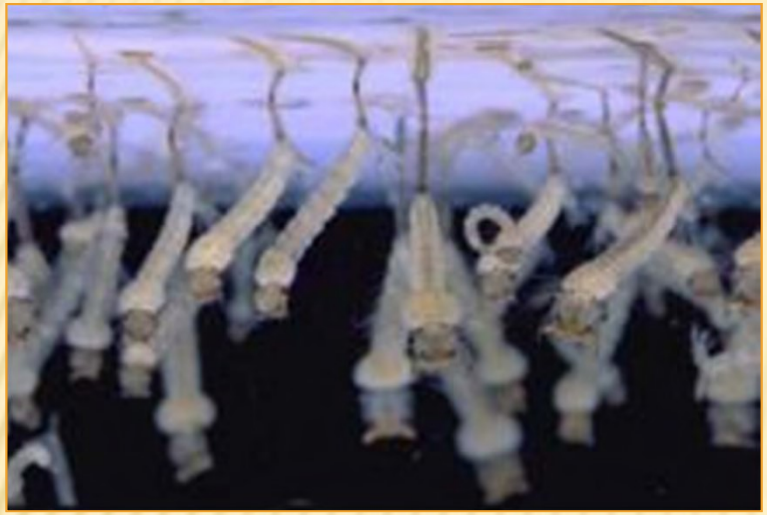

MOSQUITO MONITORING

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MOSQUITO MONITORING: OBJECTIVES

Possible objectives:

- Study of biodiversity
- General risk assessment: overview of (potential) vector or pest species
- Specific risk assessment:
  - Detection of invasive species
  - Surveillance of established vector populations
  - Identification of vector species and roles
  - Determination of populations' vector capacities
- Quality control in mosquito abatement

→ Different tools and methods for different aims.

MOSQUITO MONITORING: BASIS

- ## Why to survey adults?

- Disease vectors; provide estimates for risk assessment / vector density
- Detection of pathogens
- Determination of flight range
- Sometimes easier to identify
- Sometimes easier to sample than eggs, larvae, or pupae
- Mark-release-recapture experiments: adult survival rates

- ## Why to survey larvae?

- Rapid answer
- Origin/location of nuisance species
- Predict/prevent adult population

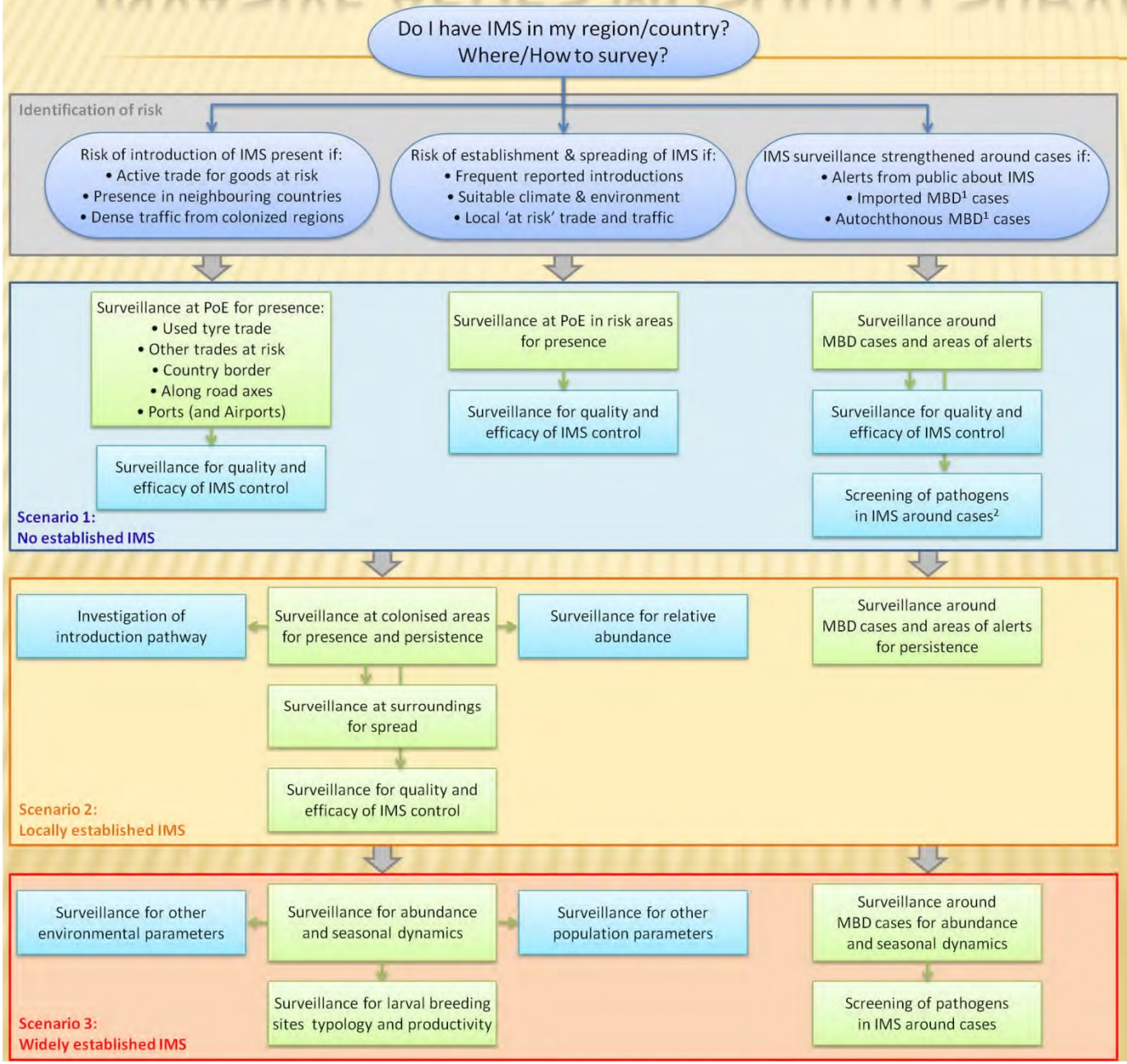
- ## Why to survey pupae?

- Pupal index (proxi to adults)

- ## Why to survey eggs?

- Proxi to adults abundance and activity

INVASIVE AEDES MOSQUITO SURVEILLANCE



[Guidance to define the surveillance methods]

Table 4: Recommended mosquito collection methods according to aims of IMS surveillance, with indications of density, frequency and period

are listed as key (in bold) or optional (in brackets); Sever
performed simultaneously (e.g. ovitraps and adult traps)
averages which must be adapted to the risk level and the si
period, other traps for 24h, 48h or one week, depending t
when visiting the trap sites; Trapping periods are given for

Scenario 1	Scenario 2	Scenario 3	Surveillance aim and sites	Met trap
			Introduction at points of entry	
✓	✓	✓	Platforms of imported used tyres	BG-S HLC Larv
✓	✓	✓	Shelters/ greenhouses for imported cutting plants like Lucky bamboo[1]	BG-S HLC Larv
✓	✓	✓	Main parking lots at country borders, highways and road axes originating from colonised areas[2]	Ovitr HLC Larv
✓	✓	✓	Ports[3]	Ovitr
(✓)	(✓)	(✓)	Airports	Ovi BG-
(✓)	✓	✓	Quality and efficacy of control measures	Ovi BG-
			Persistence in colonised area	
	✓		Inspection of colonised area	Ovi (BG HLC Lar
	(✓)	✓	Abundance and seasonal dynamics	Ovi (BG CO2 gra
		(✓)	Other mosquito population parameters (e.g. biting behaviour)	Bait asp
		✓	Infection of IMS by pathogens	Gra BG-
	✓	✓	Quality and efficacy of control measures	Ovi BG-
			Spread into areas surrounding colo	
	✓	✓	Inspections around colonised areas	Ovi
		✓	Quality and efficacy of control measures	Ovi BG-

[1] Other platforms for goods or equipment able to retain fountains, damaged military vehicles or equipment); [2] Als borders; [3] Ports with international trade; Tourist ferry por year, then can be limited to the period of development und

Scenario 1	Scenario 2	Scenario 3	Surveillance aim and sites	Methods and traps	Density of traps	Frequency of trapping	Period of trapping
			Introduction at points of entry				
✓	✓	✓	Platforms of imported used tyres	BG-Sentinel or MM HLC Larval search	1/5000m² 1 or 2 1/10 tyres	Bi-monthly Twice-yearly Twice-yearly	Apr-Nov Jul-Nov Jul-Nov
✓	✓	✓	Shelters/ greenhouses for imported cutting plants like Lucky bamboo[1]	BG-Sentinel or MM HLC Larval search	1/5000m² 1 or 2 20 vessels	Bi-monthly Twice-yearly Twice-yearly	Jan-Dec Jan-Dec Jan-Dec
✓	✓	✓	Main parking lots at country borders, highways and road axes originating from colonised areas[2]	Ovitraps HLC Larval search	1/2500m² 1 or 2 10 vessels	Bi-monthly Twice-yearly Twice-yearly	Apr-Nov Apr-Nov Apr-Nov
✓	✓	✓	Ports[3]	Ovitraps	1/5000m²	Bi-monthly	Apr-Nov

Table 5: Methods of collection of IMS adult or detection by egg collection and their efficacy according to mosquito species. HLC= human landing collection; CO_2 traps= CO_2-baited suction traps; MM= MosquitoMagnet™ CO_2-baited suction traps with chemical attractant; Light traps= light-baited suction traps; BG-Sentinel™ or Mosquitaire™= odour-baited suction traps; Gravid traps= infusion-baited suction traps; Sticky traps= water/infusion-baited oviposition trap with sticky element; Ovitraps= water/infusion-baited oviposition traps (in these traps, only eggs are collected); - low efficacy; + fair efficacy in some situation; ++ good efficacy; +++ excellent performances; ? not known.

Type of attractiveness	Host-seeking females					Oviposition-seeking females		
Trap models	HLC	CO_2 traps	MM (CO_2)	Light traps	BG-Sentinel	Gravid traps	Sticky traps	Ovi-traps
Ae. aegypti	+++	+/-	+	-	++	+/-	++	++
Ae. albopictus	+++	+/-	+	-	++	+/-	++	++
Ae. atropalpus	++	+	+	-	+/-	-	?	+
Ae. japonicus	+	+/-	+	+	+/-	++	+	+/-
Ae. koreicus	?	?	?	?	?	-	?	+
Ae. triseriatus	+++	++	++	?	++	+	+	++

MOSQUITO MONITORING: TECHNIQUES

1. Sampling adults:

- Choice depending on the target species and behaviour
  1. Imagoes on host search
  2. Imagoes on laying site search
  3. Imagoes resting or overwintering
  4. Imagoes on dispersal / migration

- Choice depending on the characteristics of the available material
  - Efficiency (quantity/quality)
  - Selectivity

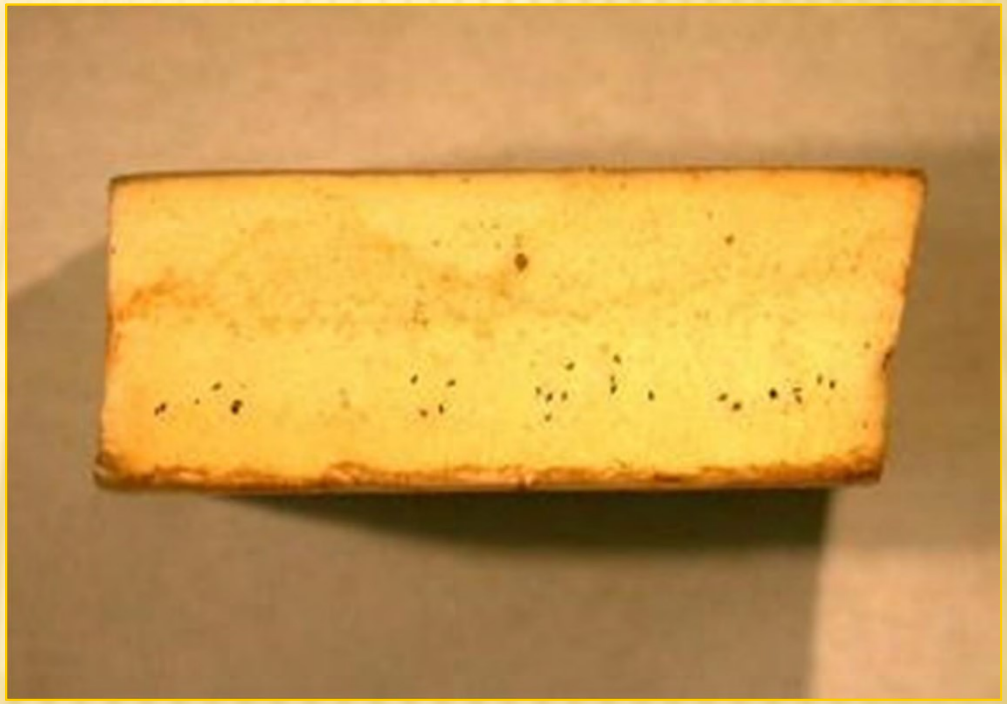
2. Sampling eggs: ovitraps

3. Sampling larvae and pupae:

- active search, larvitraps

1. SAMPLING ADULTS

2. SAMPLING EGGS



PRINCIPLES

- By imitating breeding sites, ovitraps are meant to attract gravid female mosquitoes to lay their eggs in known, easily accessible and controllable locations
- Ovitraps can be used in situations where mosquitoes are suspected to occur (e.g. to check for introduction or spread) or to assess control efficacy
- They can be particularly useful for surveying remote areas as they can be checked infrequently (intervals of several weeks to several months)

LIMITATIONS

- In some situations, it is recommended to add some long-lasting insecticide (biopesticide or insect growth regulator) in order to prevent the trap from becoming a breeding vessel

- Of note, efficiency is reduced when other breeding sites compete with the ovitraps, but their attractiveness can be improved by using dried oak leaves or hay infusion

TOOLS

- Ovitraps can be any kind of black plastic bowls (0.3 to 2 l volume) filled with water (ca. 2/3) and supplemented with an oviposition support (e.g. a wooden stick, a piece of polystyrene, germination paper)
- The size of the ovitrap (i.e. the volume of water it can contain) has to be adjusted to the trap-checking frequency as well as to the local rainfall frequency and intensity in order to prevent the trap from falling dry
- A grid can be placed on the top to avoid to lose the oviposition support

French model:

- 1 l black bucket
- water (wood or leaves infusion)
- laying support: polystyrene 5*5*2cm
- insecticide (facultative)

→Larvae and/or egg counting

Oviposition trap: black bucket + water + laying support

WHERE AND WHEN

- The best season for ovitrapping depends on temperature (itself related to latitude and altitude), as well as on the mosquito species; For most invasive species, female activity can be assumed at minimum temperatures above 10 °C
- Once the sampling sites (e.g. points of entry such as parking lots, ports, airports) are identified according to the local scenario, appropriate sites for positioning the ovitraps have to be identified
- Site positioning is performed on place: places close to or under vegetation (keeping space above the trap, e.g. around 50 cm high) or near buildings have to be found; Ideally, the positions of the ovitraps should be sketched on an outline map

WHERE AND WHEN

Recommendations for the trap density, frequency and period

Surveillance aim and sites	Density of traps	Frequency of trapping	Period of trapping
Introductions at point of entry			
Main parking lots at country borders[1], highways and road axes that originate in colonised areas, storage platforms of imported tyres	1/2500 m²	twice a month	Apr - Nov
Ports	1/5000 m²	twice a month	Apr - Nov
Airports	1/ha	monthly	Apr - Nov
Persistence in colonised area			
Inspection of colonised area	1/5 ha	twice a month	Apr - Nov
Abundance and seasonal dynamics	6/site	twice a month	Jan - Dec[2]
Spread into areas surrounding colonised area			
Inspection around colonized areas	1/15 ha	monthly	Apr - Nov

[1] *Includes parking lots at commercial centres close to country borders.*

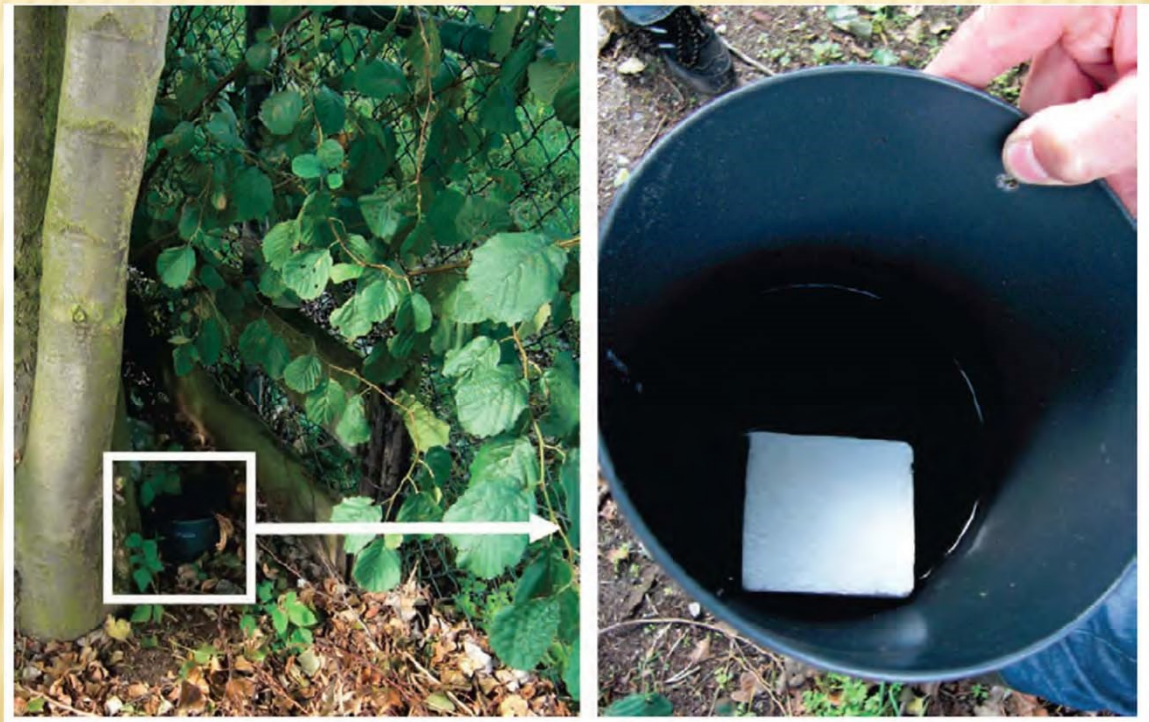
[2] *Required during the first year; can later be limited to the period of development in the local climate.*

WHERE AND WHEN

- Although ovitraps are cheap and easy to use, identification of eggs is difficult and time-consuming, and the correlation between number of eggs and female density is not always obvious, as females do not lay all their eggs in a single vessel, particularly if there are other options like used tyres
- For detecting the presence of an IMS, it is recommended to use three to five ovitraps simultaneously in one place (i.e. a parking lot or a district of a city) in order to increase the sensitivity of the trapping
- Traps can also be placed in different micro-environmental conditions (e.g. south or north side of a building, under vegetation, in a less obstructed area, or near various putative hosts)

TIPS & EXAMPLES

- exemple of trap placement



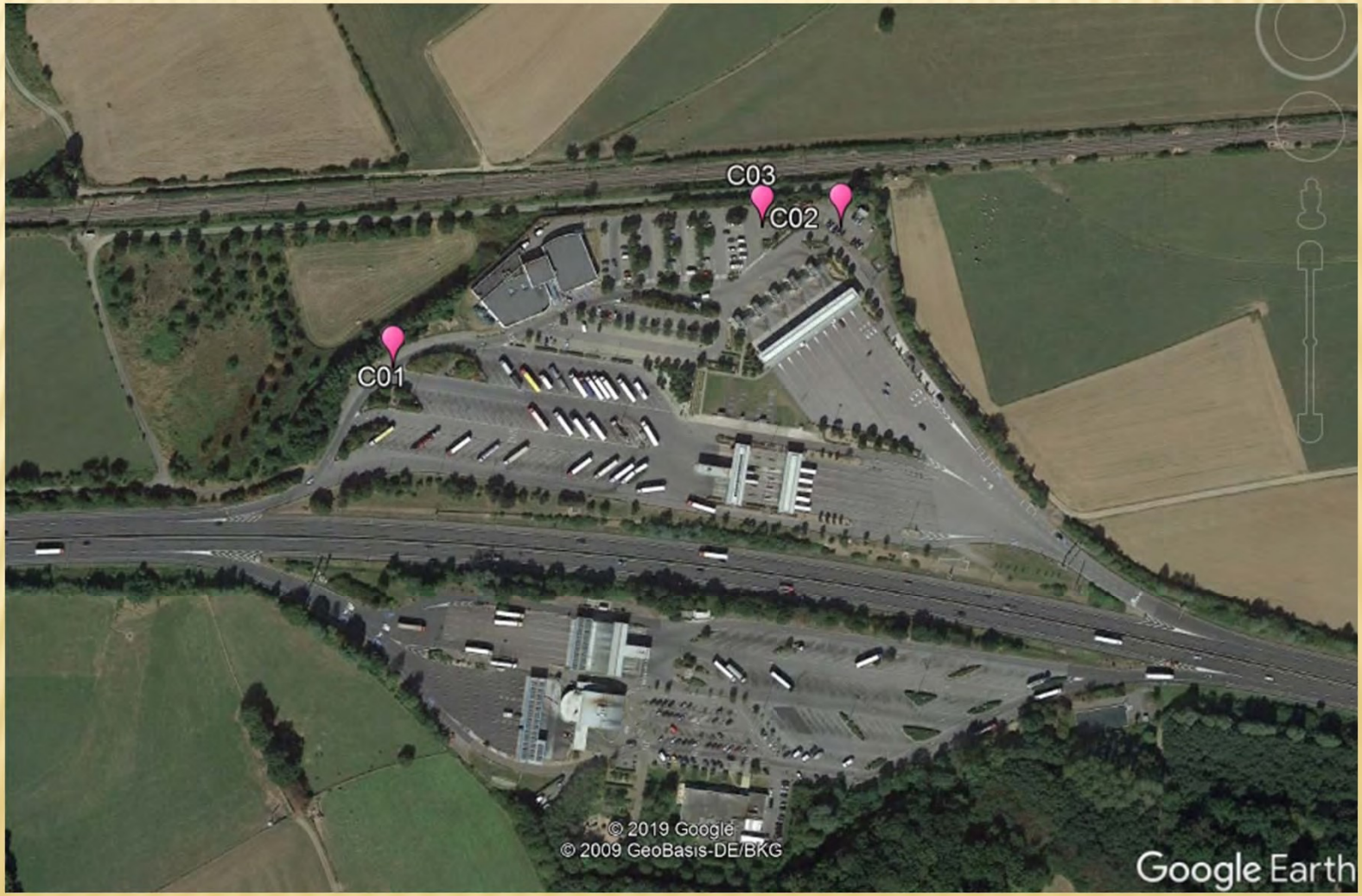
Above: Ovitrap in shrubs

Photo: E.-J. Scholte (Dutch National Centre for Monitoring of Vectors, CMV, NVWA)

Source: ECDC Guidelines, 2012

TIPS & EXAMPLES

Example of trap placement on a highway parking lot (Luxembourg, 2019)



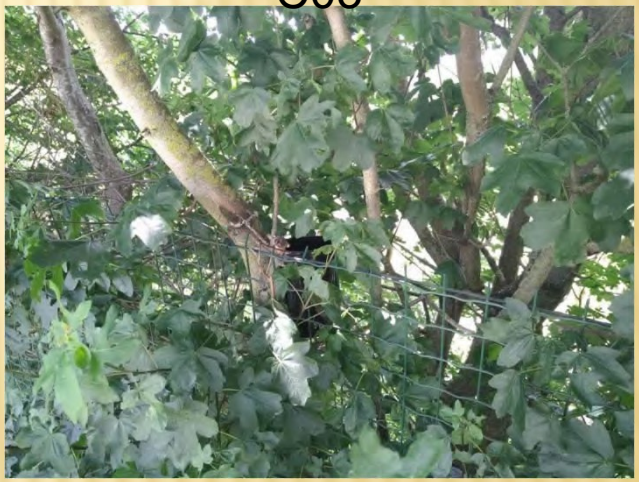
TIPS & EXAMPLES

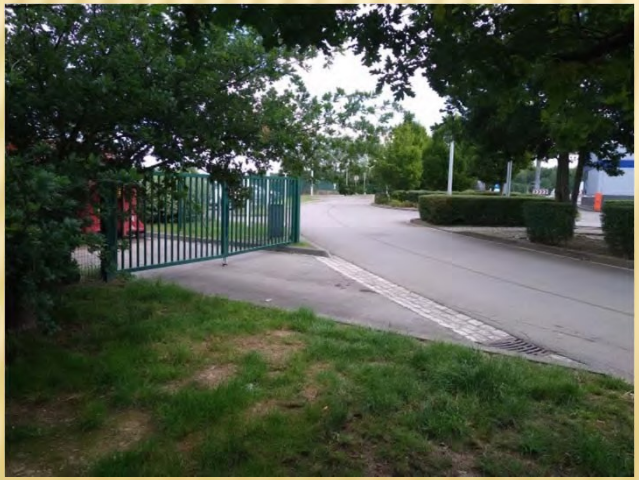
Example of trap placement on a highway parking lot (Luxembourg, 2019)

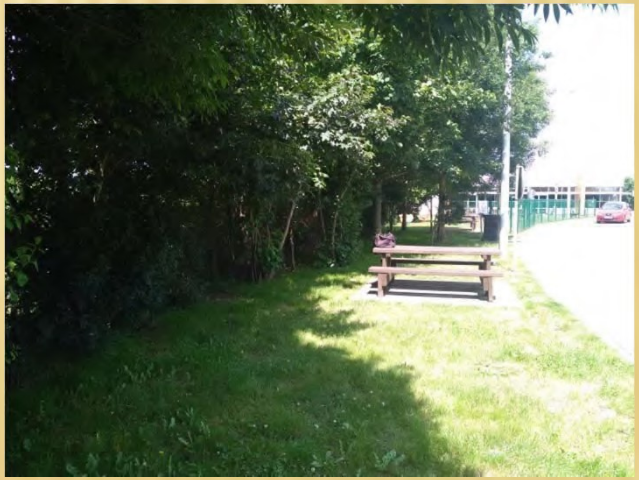
C01

C02

C03

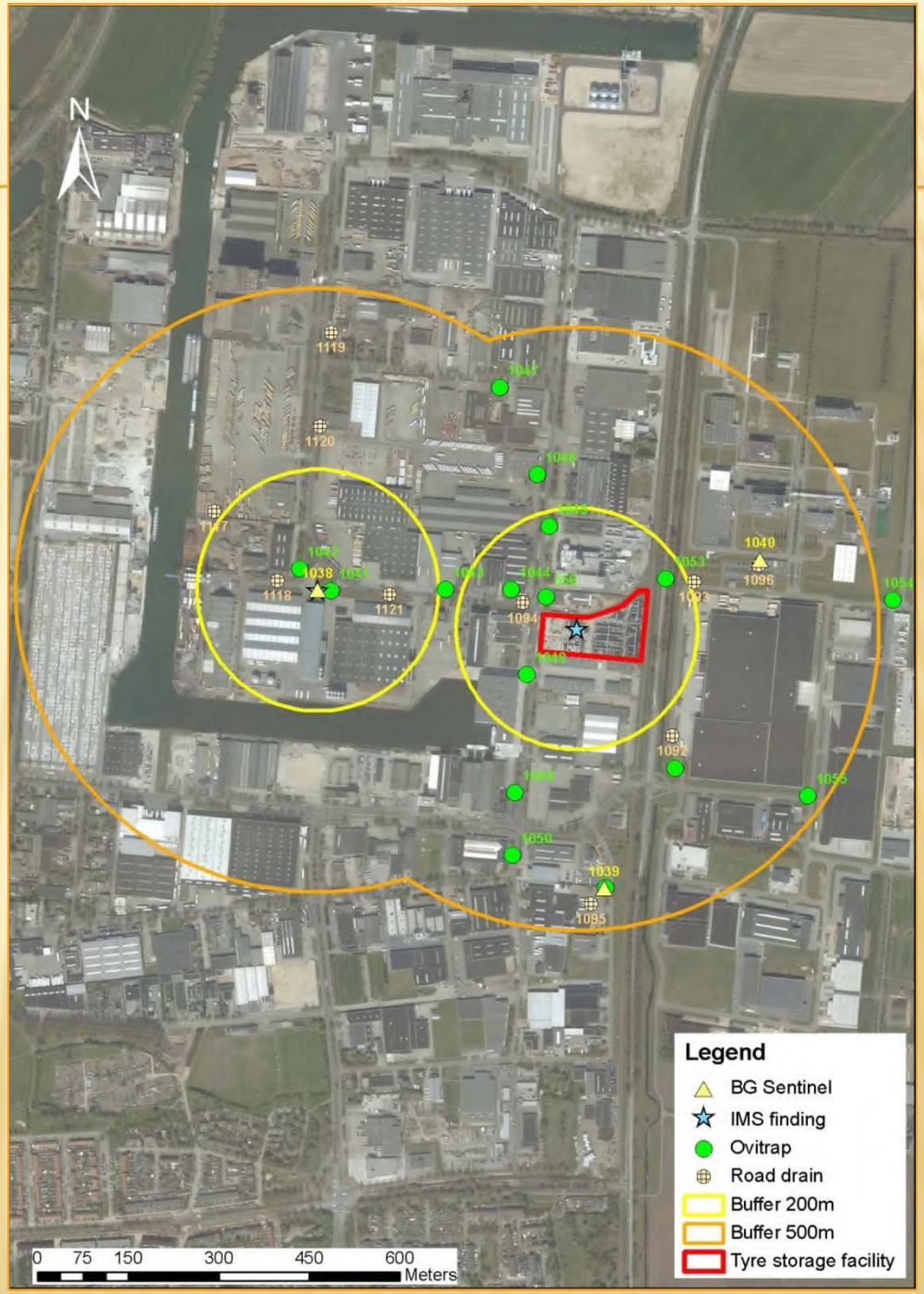






TIPS & EXAMPLES

Example of placement of traps and definition of the area to be surveyed at an infested storage site for used tyres



Source: ECDC Guidelines, 2012

FIELD DATA AND PARAMETERS TO BE RECORDED

- ☑ Place (georeferenced: WGS84 system, D.NNNNNN)
- ☑ Environment/Land use
- ☑ Type of site
- ☑ Date, time of placing and removing oviposition support
- ☑ Trap status (present/absent, dry…)
- ☑ Weather parameters (temperature, rainfall) during the period of trap activity, if accessible
- ☑ Person collecting traps/oviposition supports
- ☑ Results (number of eggs, species)

TIPS & EXAMPLES

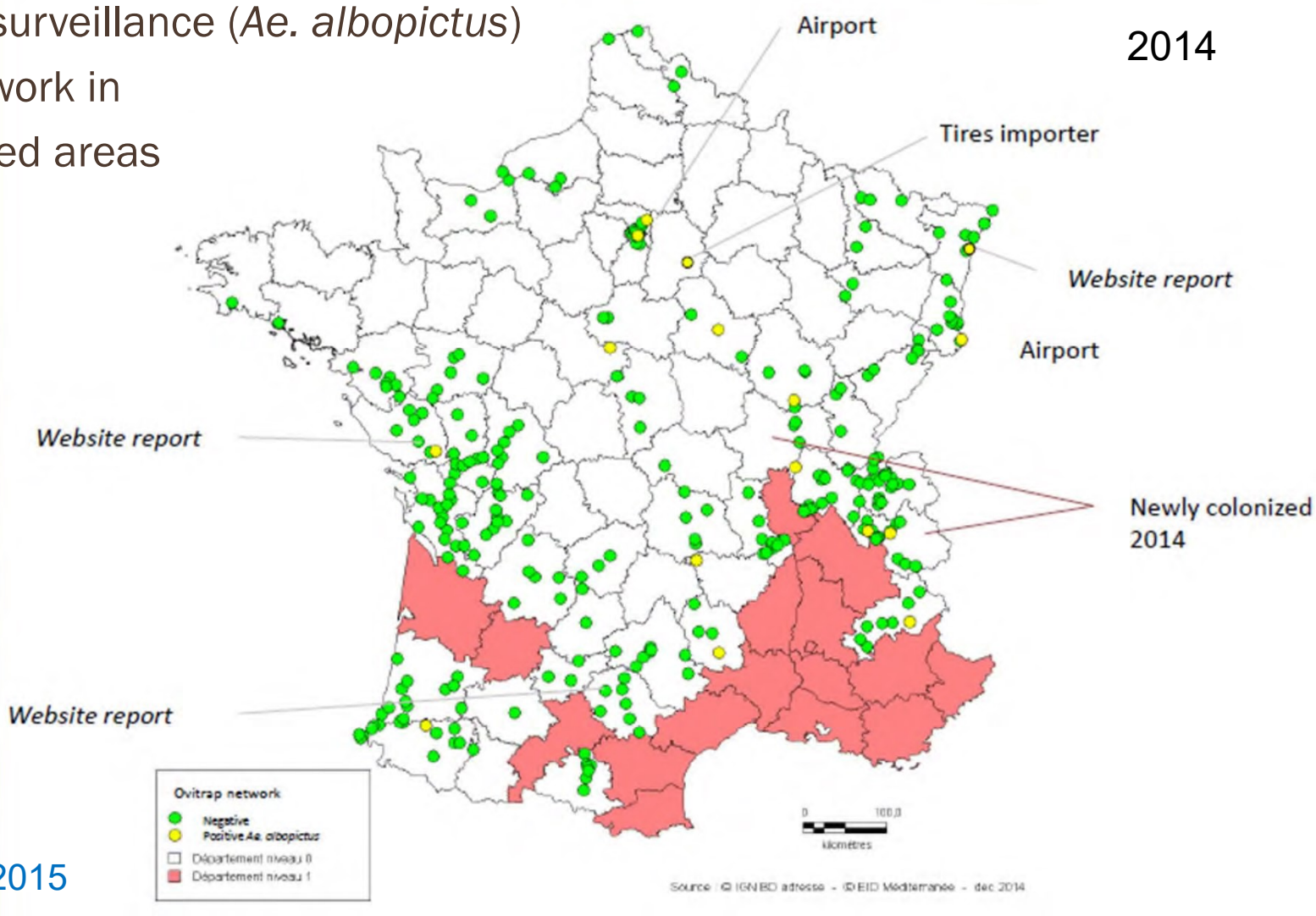
Data set: ovitrap network on the French Riviera, 2007

					Relevé n° 7 (Août/Sept)			Relevé n° 8 (Sept)			Relevé n° 9 (Oct)			Relevé n° 10 (Oct)			Relevé n° 11 (nov)			Relevé n° 12 (déc)	
N pièges posés // semaine :			tot	49	s35-37			s39			s41			s43			S46			S49	
Lieu-dit / Station	Lon DEG.DDDDD	Lon DEG.DDDDD	N° piège	Date pose	Date relevé	Résultat	Observations	Date relevé	Résultat	Observations	Date relevé	Résultat	Observations	Date relevé	Résultat	Observations	Date relevé	Résultat	Observations	Date relevé	Résultat
Carrefour des anglais (entrée)	43.26440	06.46717	SP 351	10. Mai 07	12-sept.-07	N	RAS	27-sept.-07	N	RAS	11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Jardin d'Armenie (centre proche port)	43.25487	06.45882	SP 352	10. Mai 07	12-sept.-07	0	SP	27-sept.-07	N	RAS	11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	0
cimetière A.Karr	43.25616	06.46931	SP 352 a	12. Sep 07				27-sept.-07	N	RAS	11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Ranch de l'Esterelle	43.27086	06.49954	SP 352 b	12. Sep 07				27-sept.-07	N	RAS	11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Cimetière de L'Aspe	43.26242	06.48666	SP 352 c	12. Sep 07				27-sept.-07	N	RAS	11-oct.-07	0	SP	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Golf de Valescure	43.27334	06.47318	SP 352 d	12. Sep 07				27-sept.-07	N	RAS	11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Rond Point des Anciens Combattants	43.25038	06.47090	SP 352 e	27. Sep 07							11-oct.-07	N	RAS	26-oct.-07	0	PP	13-nov.-07	N	RAS	7-déc.-07	0
(Quartier Bouloris	43.25302	06.48389	SP 352 f	27. Sep 07							11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Antheor	43.26197	06.53527	SP 352 g	27. Sep 07							11-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Parc médiathèque	43.26073	06.44572	SP 353	10. Mai 07	12-sept.-07	N	RAS	27-sept.-07	N	RAS	10-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Gare SNCF	43.25924	06.43963	SP 354	10. Mai 07	12-sept.-07	0	SP	27-sept.-07	N	RAS	10-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Cimetière de St-Etienne	43.26159	06.44026	SP354 a	12. Sep 07				27-sept.-07	N	RAS	10-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Quartier de la Tour-de-Mare	43.27433	06.45720	SP354 b	12. Sep 07				27-sept.-07	2	Positif	10-oct.-07	9	Positif	26-oct.-07	0	PP	13-nov.-07	N	RAS	7-déc.-07	N
Jardin de César	43.27340	06.45269	SP354 c	12. Sep 07							10-oct.-07	12	Positif	26-oct.-07	AP	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Quartier de la Musoadière	43.27691	06.46027	SP354 d	12. Sep 07							10-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Résidence les Pierres d'Azur	43.26985	06.45601	SP354 e	12. Sep 07							10-oct.-07	N	RAS	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Hôtel de ville	43.27373	06.40962	SP 355	10. Mai 07	NR	NR	NR	27-sept.-07	N	RAS	NR	NR	NR	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Cimetière n°4	43.27574	06.41430	SP 356	10. Mai 07	NR	NR	NR	27-sept.-07	N	RAS	NR	NR	NR	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Parking entré de ville	43.26578	06.38116	SP 357	10. Mai 07	NR	NR	NR	27-sept.-07	N	RAS	NR	NR	NR	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Hôtel de ville	43.26553	06.38222	SP 358	10. Mai 07	NR	NR	NR	27-sept.-07	N	RAS	NR	NR	NR	26-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
Parc centre ville	43.32243	06.27700	SP 359	10. Mai 07	NR	NR	NR	NR	NR	NR	2-oct.-07	N	RAS	25-oct.-07	N	RAS	13-nov.-07	N	RAS	NR	NR
entré de ville	43.31589	06.28275	SP 360	10. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	25-oct.-07	N	RAS	13-nov.-07	N	RAS	NR	NR
proche jeux pour enfant	43.24837	06.27209	SP 361	10. Mai 07	NR	NR	NR	26-sept.-07	N	SP	NR	NR	NR	25-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	0
face entré boutique	43.24957	06.27110	SP 362	10. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	25-oct.-07	N	RAS	13-nov.-07	N	RAS	NR	NR
casino Barrière	43.18502	06.38257	SP 363	10. Mai 07	NR	NR	NR	26-sept.-07	N	RAS	NR	NR	NR	25-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	N
maison bord de mer N°11	43.17886	06.37597	SP 364	10. Mai 07	29-août-07	3	Positif	26-sept.-07	5	Positif	NR	NR	NR	25-oct.-07	54	Positif	14-nov.-07	N	RAS	7-déc.-07	N
Plage des Pingouins bleus	43.17422	06.36520	SP364 a	29. Aug 07				26-sept.-07	N	RAS	NR	NR	NR	25-oct.-07	N	RAS	14-nov.-07	0	PP	7-déc.-07	N
Escalier quartier grande croisette	43.17954	06.37370	SP364 b	29. Aug 07				26-sept.-07	0	SP	NR	NR	NR	26-oct.-07	N	RAS	14-nov.-07	0	SP	7-déc.-07	0
Cimetière	43.18077	06.37170	SP364 c	29. Aug 07				26-sept.-07	0	SP	NR	NR	NR	25-oct.-07	N	RAS	14-nov.-07	N	RAS	7-déc.-07	N
Parc botannique	43.18126	06.37531	SP364 d	29. Aug 07				26-sept.-07	92	Positif	NR	NR	NR	25-oct.-07	80	Positif	14-nov.-07	N	RAS	7-déc.-07	N
Voie privée,au dessus Parc bota	43° 18' 14"	06° 37' 30"	SP364 e	26. Sep 07							NR	NR	NR	25-oct.-07	105	Positif	14-nov.-07	39	Positif	7-déc.-07	N
quartier des Mythes au dessus Parc bota	43° 18' 10"	06° 37' 26"	SP364 f	26. Sep 07							NR	NR	NR	25-oct.-07	N	RAS	14-nov.-07	N	RAS	7-déc.-07	N
Bord de mer dir st tropez	43.17296	06.36220	SP 365	10. Mai 07	29-août-07	N	RAS	26-sept.-07	N	RAS	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
proche station de bus	43.16130	06.38024	SP 366	10. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	26-oct.-07	0	SP	14-nov.-07	N	RAS	7-déc.-07	N
maison bord de mer dir sortie de ville	43.15842	06.37152	SP 367	10. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	26-oct.-07	0	PP	14-nov.-07	N	RAS	7-déc.-07	N
zone verte bord axe routier principal	43.07041	06.09631	SP 368	10. Mai 07	NR	NR	NR	27-sept.-07	N	RAS	NR	NR	NR	NR	NR	NR	14-nov.-07	N	RAS	7-déc.-07	N
centre ville entré parking clémenceau	43.07254	06.07948	SP 369	10. Mai 07	NR	NR	NR	27-sept.-07	N	RAS	8-oct.-07	N	RAS	NR	NR	NR	14-nov.-07	0	SP	7-déc.-07	N
rond point face gare SNCF	43.07671	05.55771	SP 370	11. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	14-nov.-07	N	RAS	NR	NR
Parc des cèdres, quartiers Pont-du-tas	43.07639	05.54566	SP 371	11. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	14-nov.-07	0	SP	NR	NR
église	43.05521	05.50261	SP 372	11. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	14-nov.-07	N	RAS	NR	NR
face casino supermarché	43.05626	05.50704	SP 373	11. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	14-nov.-07	N	RAS	NR	NR
dernière boutique, portillon employés	43.25259	05.59453	SP 374	11. Mai 07	NR	NR	NR	26-sept.-07	N	RAS	NR	NR	NR	25-oct.-07	N	RAS	13-nov.-07	N	RAS	7-déc.-07	0
entré proche rond point	43.25409	05.59461	SP 375	11. Mai 07	NR	NR	NR	NR	NR	NR	NR	NR	NR	26-oct.-07	N	RAS	13-nov.-07	N	RAS	NR	NR
Jardin de l'Enclos	43.27222	05.51829	SP 376	11. Mai 07	NR	NR	NR	26-sept.-07	0-janv.-00	SP	NR	NR	NR	27-oct.-07	N	RAS	13-nov.-07	N	RAS	NR	NR
entrée du village (dans virage)	43.27080	05.51718	SP 377	11. Mai 07	NR	NR	NR	26-sept.-07	N	RAS	NR	NR	NR	28-oct.-07	N	RAS	13-nov.-07	N	RAS	NR	NR
Aéroport	43.05659	06.09509	SP 394	13. Sep 07				26-sept.-07	N	RAS	10-oct.-07	N	RAS	NR	NR	NR	10-nov.-07	N	RAS	NR	NR

TIPS & EXAMPLES

Country-wide surveillance (*Ae. albopictus*)

- Ovitrap network in non-colonised areas



Source: EID LM, 2015

TIPS & EXAMPLES

Country-wide surveillance (*Ae. albopictus*)

- National ovitrap network
- Partner & admin unit allocation

2018

Région/Département		Nb de pièges pondoirs	Niveau
Auvergne-Rhône-Alpes			
1	Ain	46	1
3	Allier	5	0b
7	Ardèche	31	1
26	Drôme	23	1
38	Isère	69	1
42	Loire	38	0
63	Puy-de-Dôme	3	0b
69	Rhone	100	1
73	Savoie	51	1
74	Haute-Savoie	21	0
Bourgogne-Franche-Comté			
21	Côte d'Or	10	0
58	Nièvre	18	0b
71	Saône-et-Loire	31	1
Bretagne			
22	Côte d'Armor	8	0
29	Finistère	5	0
35	Ille-et-Vilaine	4	0
56	Morbihan	49	0
Centre-Val-de-Loire			
18	Cher	10	0b
28	Eure-et-Loir	8	0
36	Indre	33	1
37	Indre-et-Loir	22	0
41	Loir-et-Cher	16	0b
45	Loiret	20	0
Corse			
2B	Haute-Corse	30	1
2A	Corse-du-Sud	28	1
Grand-Est			
67	Bas-Rhin	128	1
68	Haut-Rhin	116	1
Hauts-de-France			
2	Aisne	89	1
59	Nord	30	1
60	Oise	26	0b
62	Pas-de-Calais	8	0
80	Somme	8	0
Ile-de-France			
75	Paris	77	0
77	Seine-et-Marne	28	0b
78	Yvelines	23	0
91	Essonne	59	0b
92	Hauts-de-Seine	35	1
93	Seine-Saint-Denis	31	0
94	Val-de-Marne	57	1
95	Val-d'Oise	20	0

Région/Département		Nb de pièges pondoirs	Niveau
Normandie			
14	Calvados	18	0
27	Eure	4	0
61	Orne	5	0
76	Seine-Maritime	37	0
Nouvelle-Aquitaine			
16	Charente	49	1
17	Charente-Maritime	175	0b
19	Corrèze	35	1
23	Creuse	10	0
24	Dordogne	68	1
33	Gironde	504	1
40	Landes	56	1
47	Lot-et-Garonne	26	1
64	Pyrénées-Atlantiques	93	1
79	Deux-Sèvres	83	0b
86	Vienne	25	0
87	Haute-Vienne	7	0
Occitanie			
9	Ariège	49	1
11	Aude	103	1
12	Aveyron	51	1
30	Gard	52	1
31	Haute-Garonne	72	1
32	Gers	65	1
34	Hérault	150	1
46	Lot	6	1
48	Lozère	49	1
65	Hautes-Pyrénées	37	1
66	Pyrénées-Orientales	107	1
81	Tarn	79	1
82	Tarn-et-Garonne	14	1
Pays-de-la-Loire			
44	Loire-Atlantique	34	0
49	Maine-et-Loire	159	1
53	Mayenne	6	0
72	Sarthe	24	0
85	Vendée	166	1
Provence-Alpes-Côte d'Azur			
4	Alpes-de-Haute-Provenc	37	1
5	Hautes-Alpes	51	1
6	Alpes-Maritimes	50	1
83	Var	36	1

Total 2018	**4006**
Total niveau 0	945
Total niveau 1	3061

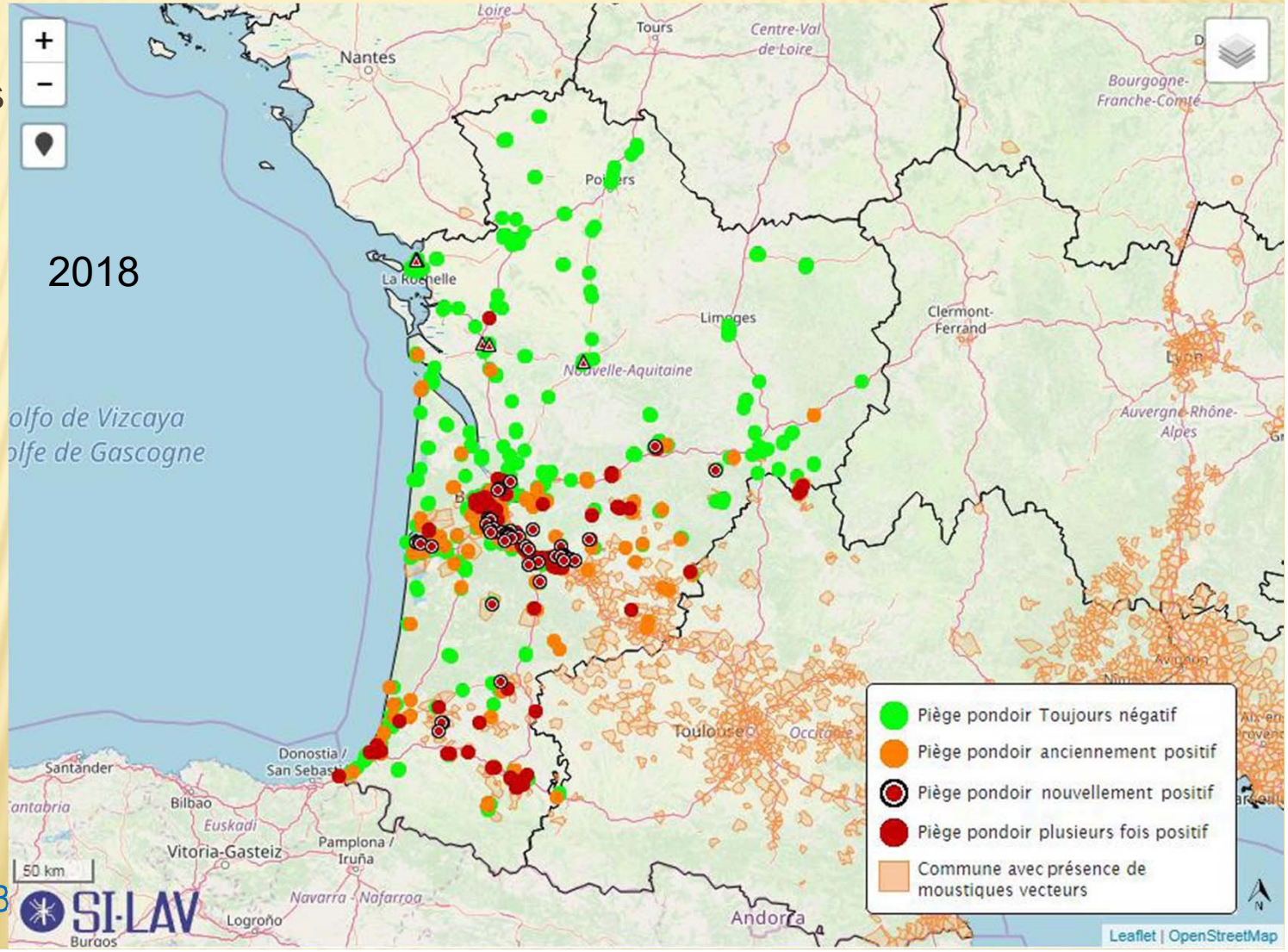
Opérateurs

Brigade verte du Haut-Rhin	ARS Corse
SLM 67	EID Méditerranée
EID Rhône-Alpes	EID Atlantique
Département et/ou opérateur privé	ELIZ

Source: EID LM, 2018

TIPS & EXAMPLES

Regional ovitrap network & results

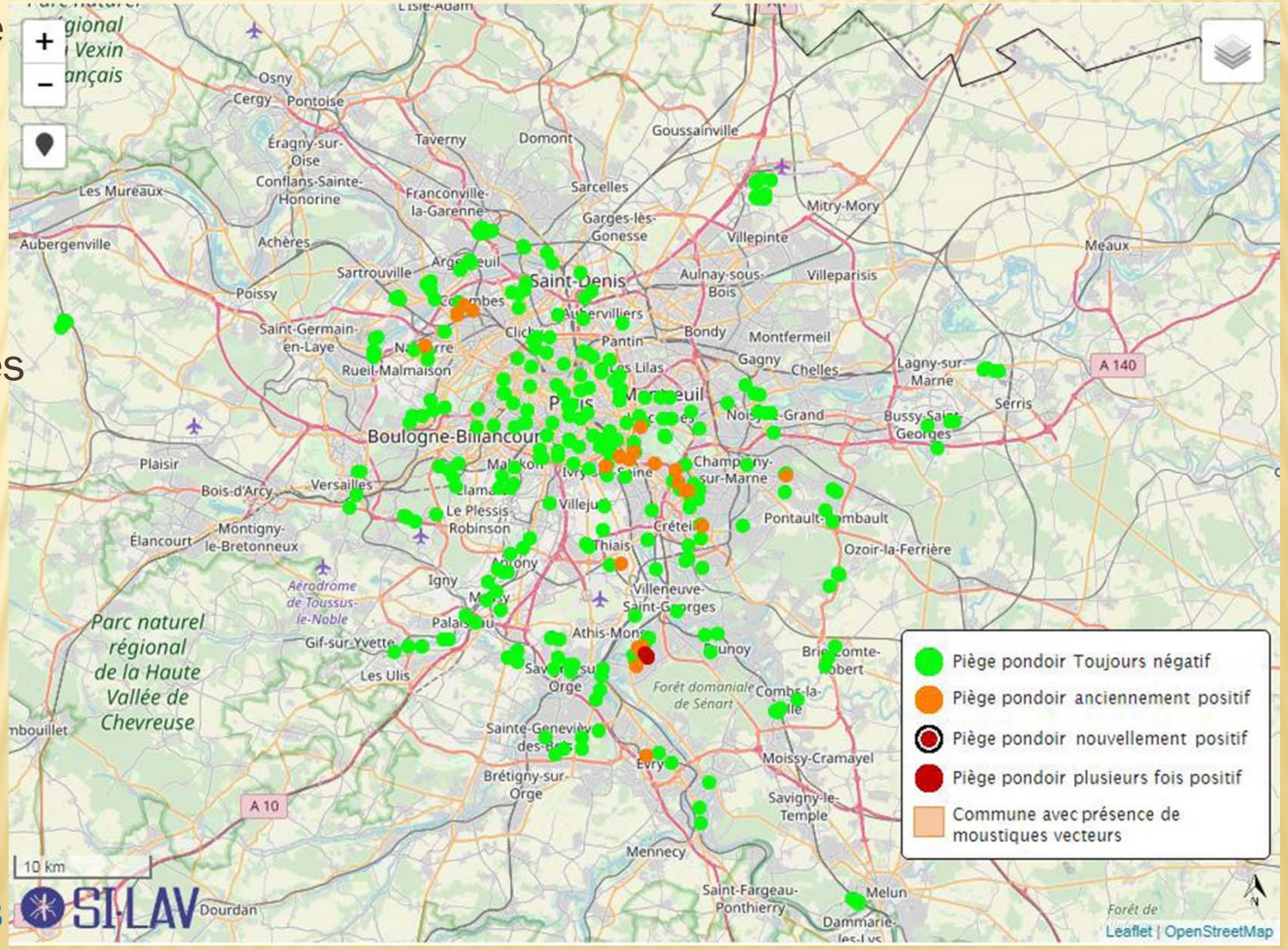


Source: EID LM, 2018

TIPS & EXAMPLES

Local surveillance network & results Ile-de-France (incl. Paris)

- 238 traps
- 42 municipalities

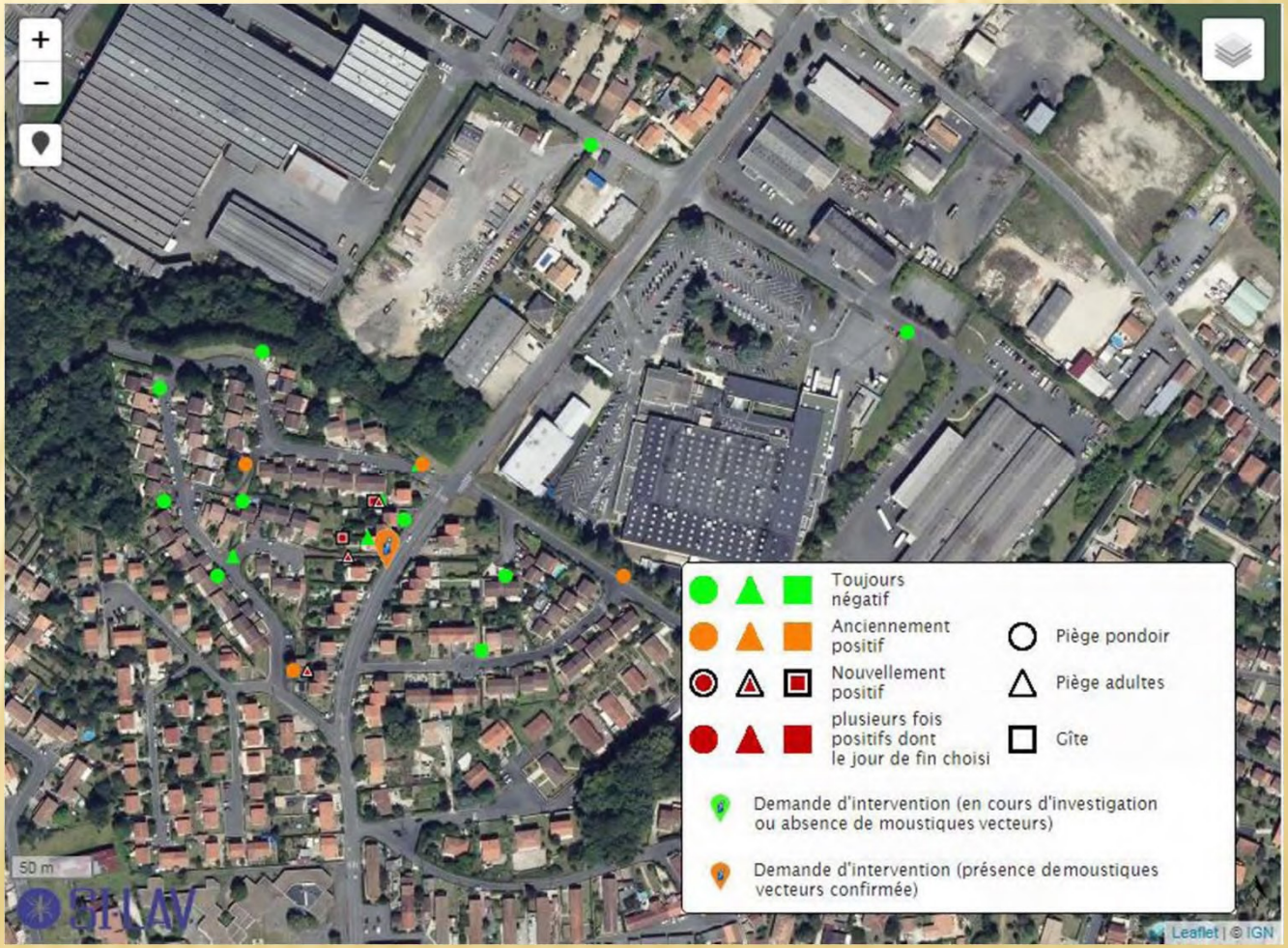


Source: EID LM, 2018

TIPS & EXAMPLES

Focus surveillance: An industrial zone and its inhabited surrounding

- Angoulème, 2018
- Citizen report
- Surveillance and treatment
- 15 traps

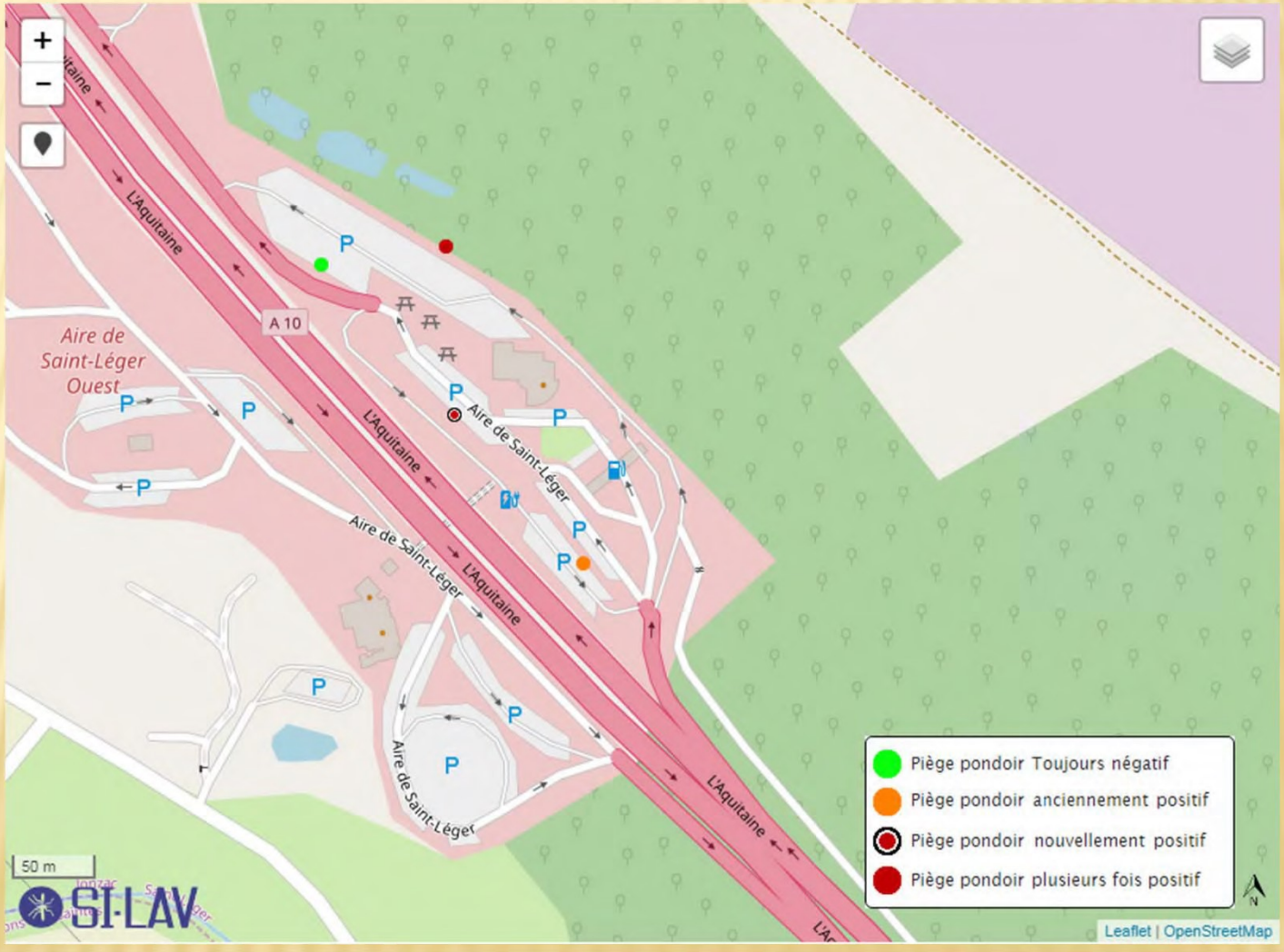


Source: EID LM, 2018

TIPS & EXAMPLES

Focus surveillance: A highway parking lot

Saint-Léger, 2018

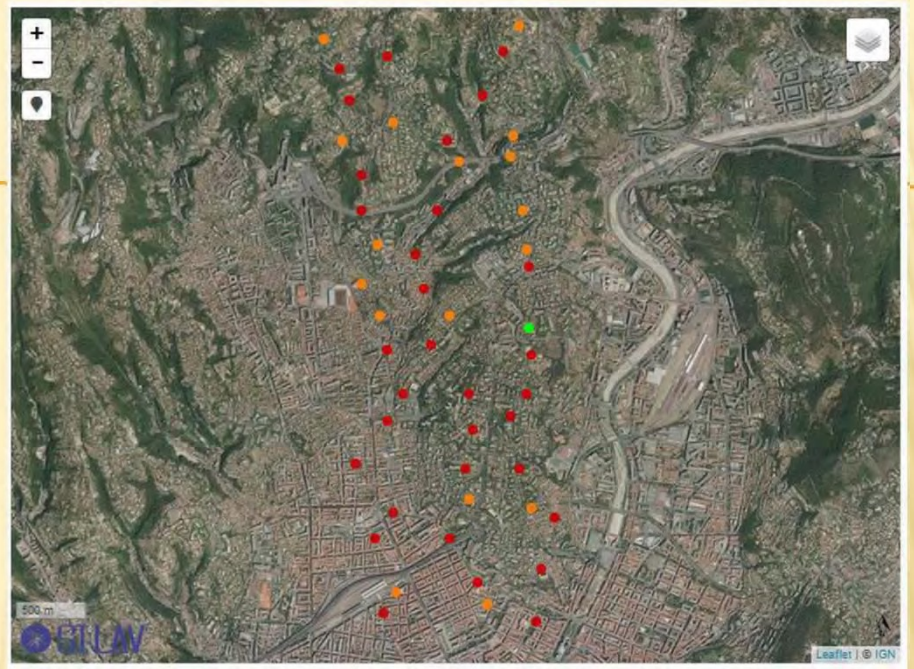


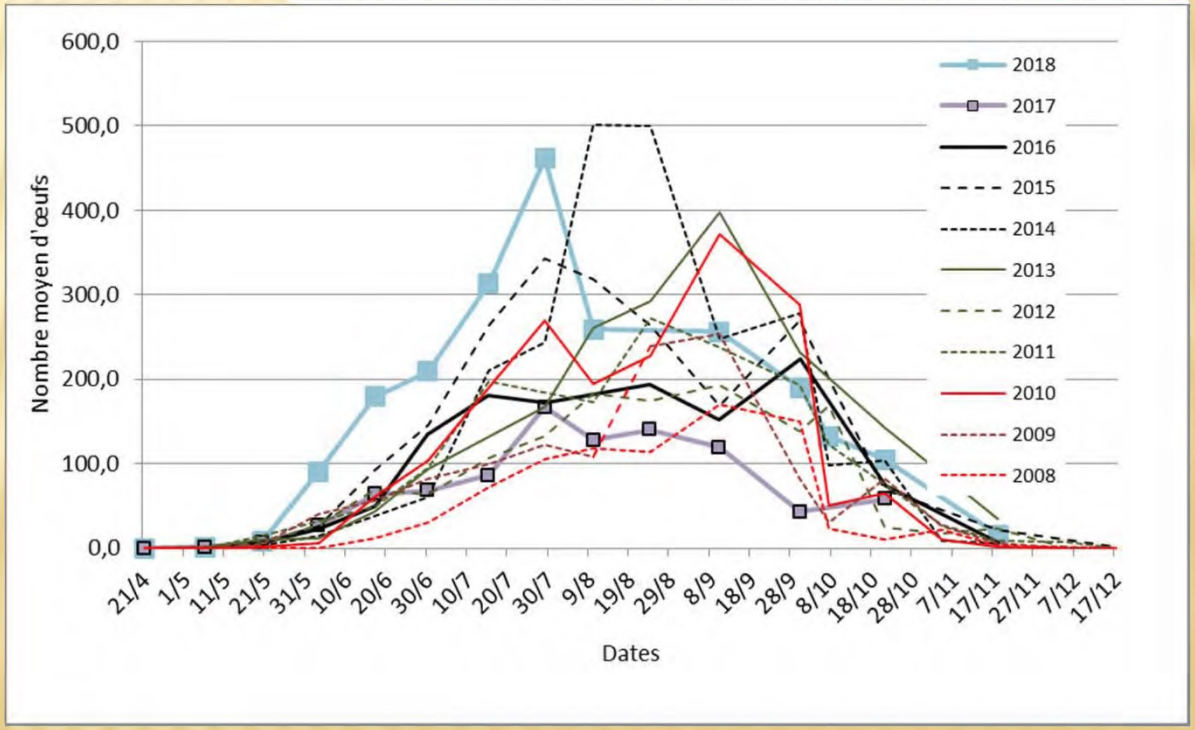
Source: EID LM, 2018

TIPS & EXAMPLES

Longitudinal survey:

- ✓ Established population
- ✓ 50 ovitraps
- ✓ Nice (French Riviera)





Mean number of eggs per trap per 15 days, 2008-2018

Source: EID LM 2018

SAMPLE CONSERVATION

- Oviposition supports can be stored in a closed plastic bag, at room temperature or in a fridge (5-15°C)
- The bag should not contain free water, but should still be humid (around 55% RH)
- For genetic identification (PCR, DNA sequencing), the eggs can be put in 70-80% ethanol
- For MALDI-TOF the eggs are best kept on the oviposition support (but they should not dry out) and transferred to microtubes (dry) before sending for analysis.

CHECKLIST FOR THE FIELD STUDY

- ☑ Smartphone or field data reporting system (e.g. VECMAP™ app)
- ☑ Ovitraps: black plastic bowls (d 12 cm, h 13 cm, vol 1.0 l, **with label**)
- ☑ Piece (5x5x2.5 cm) of extruded polystyrene (for floor insulation), **labelled** (number or place and date)
- ☑ Water infusion from hay and/or dead oak leaves
- ☑ Zipper locking plastic bags (10x15 cm) for storing oviposition support (**to label with end date**)
- ☑ Permanent marker
- ☑ Tissue paper
- ☑ Outline map
- ☑ Pencil
- ☑ Field magnifying glass
- ☑ Vials (should ovipositing females be caught red-handed or larvae be found in the traps)

Should the eggs need to be transferred to alcohol for genetic analyses right on the spot:

- ☑ Entomological forceps
- ☑ Ethanol (70-80%)
- ☑ Labels

EGG SORTING AND COUNTING

Example of positive oviposition support