UNIVERSITY OF L'AQUILA

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OCCURRENCE OF LEGIONELLA SPP. IN WORKPLACES IN ITALY: A NATIONWIDE SURVEY

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Ws questions

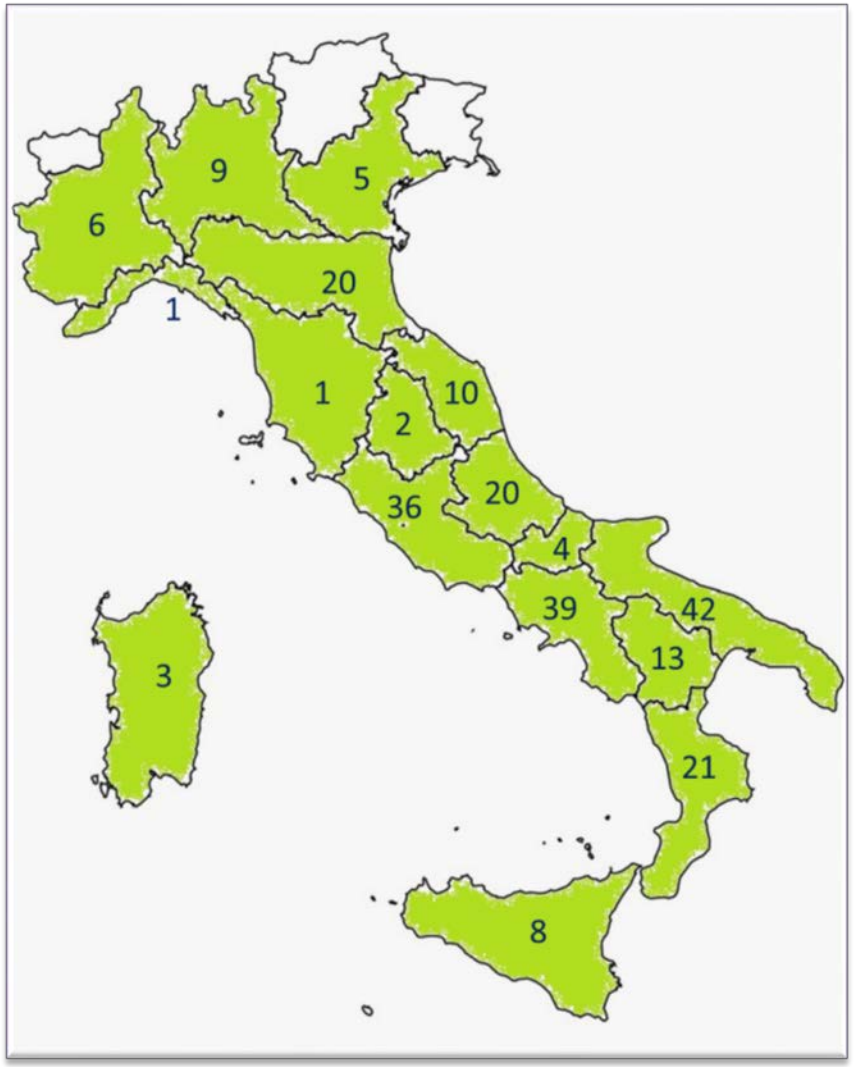
- Who: University of l'Aquila and companies involved in risk assessment
- What: prevalence of *Legionella* spp. in water supply systems, in workplaces in Italy
- Why: risk assessment and management in accordance with Italian regulations
- When: from February 2014 to March 2015
- Where: 240 workplace sites were sampled in 17 out of 20 Italian Regions and 2,286 samples

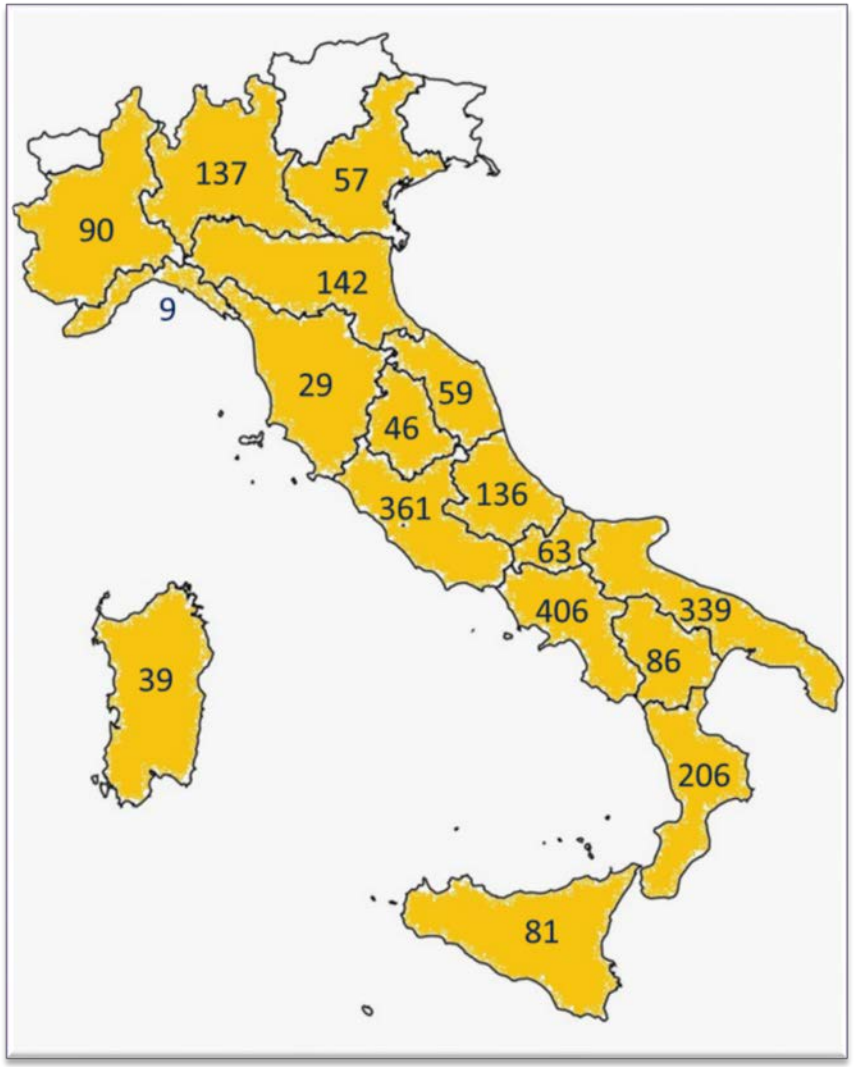
Sampling criteria

- Sampling were carried out in accordance to Italian guidelines for legionellosis risk assessment and management (guidelines 2015)
- The number of samples were determined also on the base of:
  - Number of employees
  - Size of the water delivery system
  - Presence of showers (e.g. industrial sites)
  - Presence of cold water reservoirs (South Italy)
  - Average temperature of cold and hot water

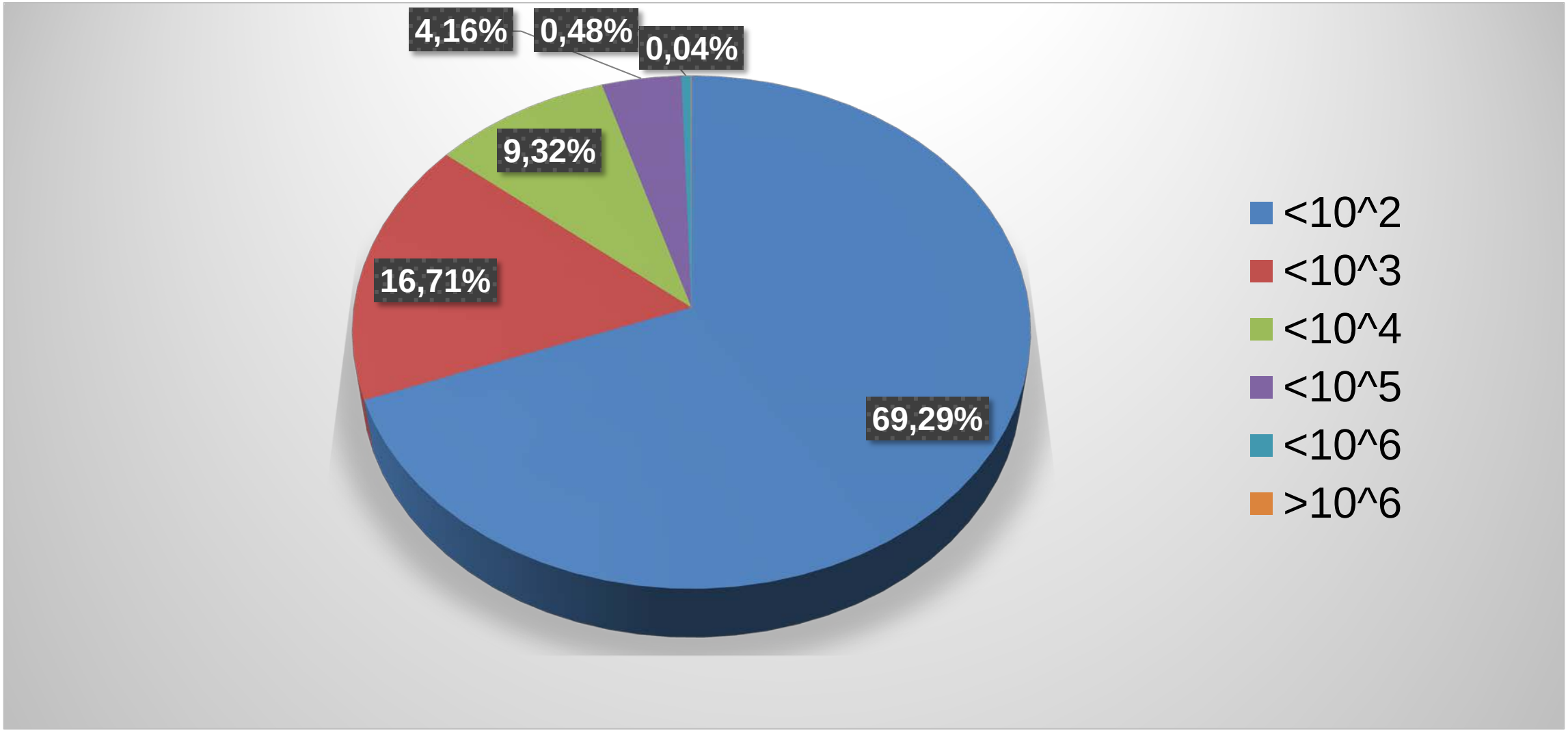
number of sites: 240

number of samples: 2286



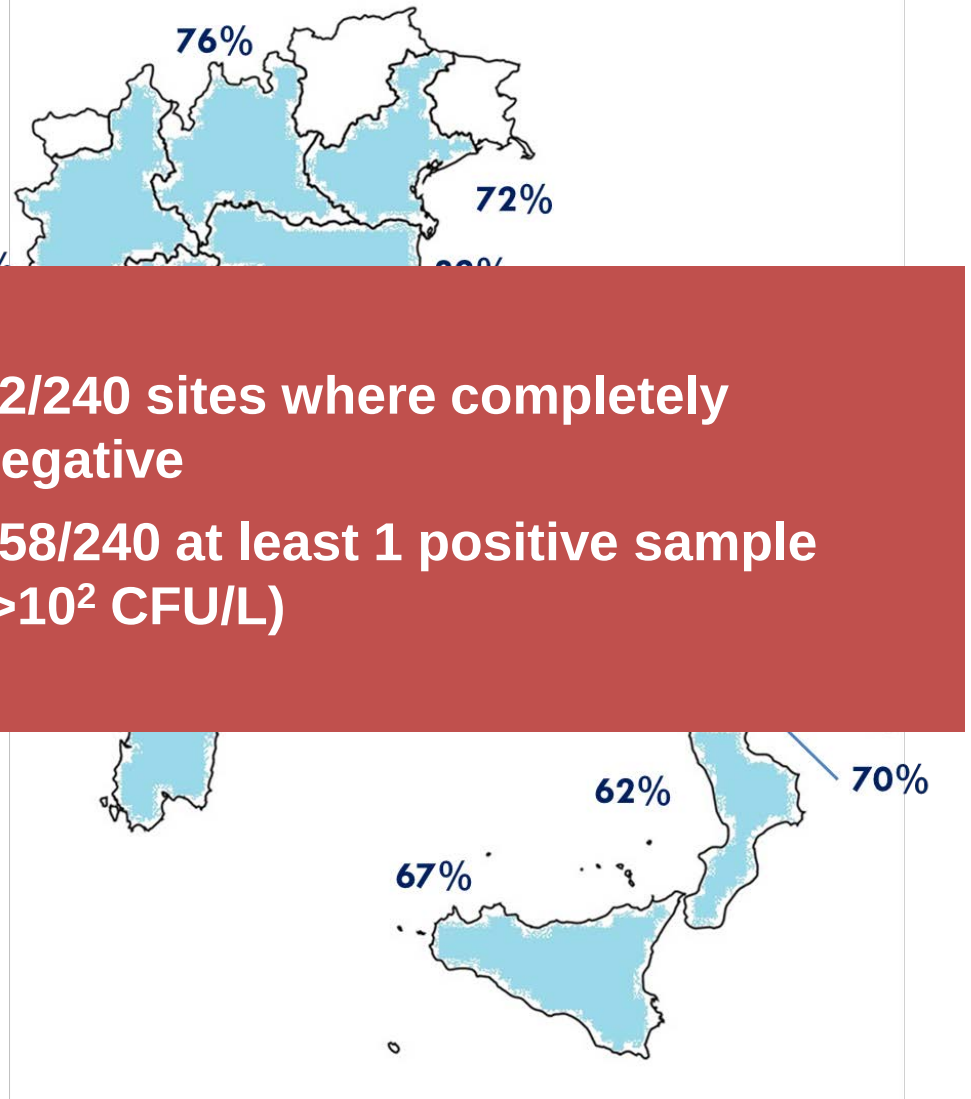


Legionella spp. count (CFU/L)

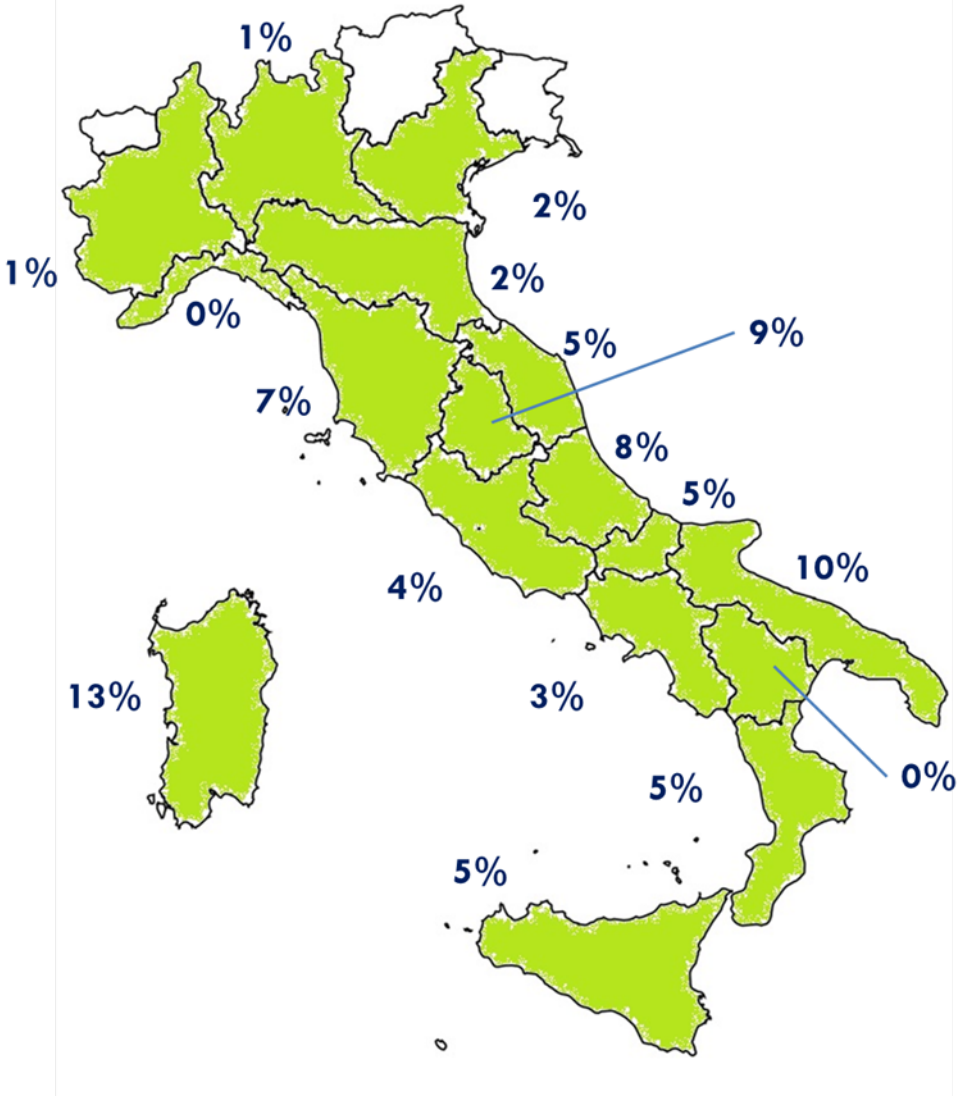


Count <10^2 CFU/L

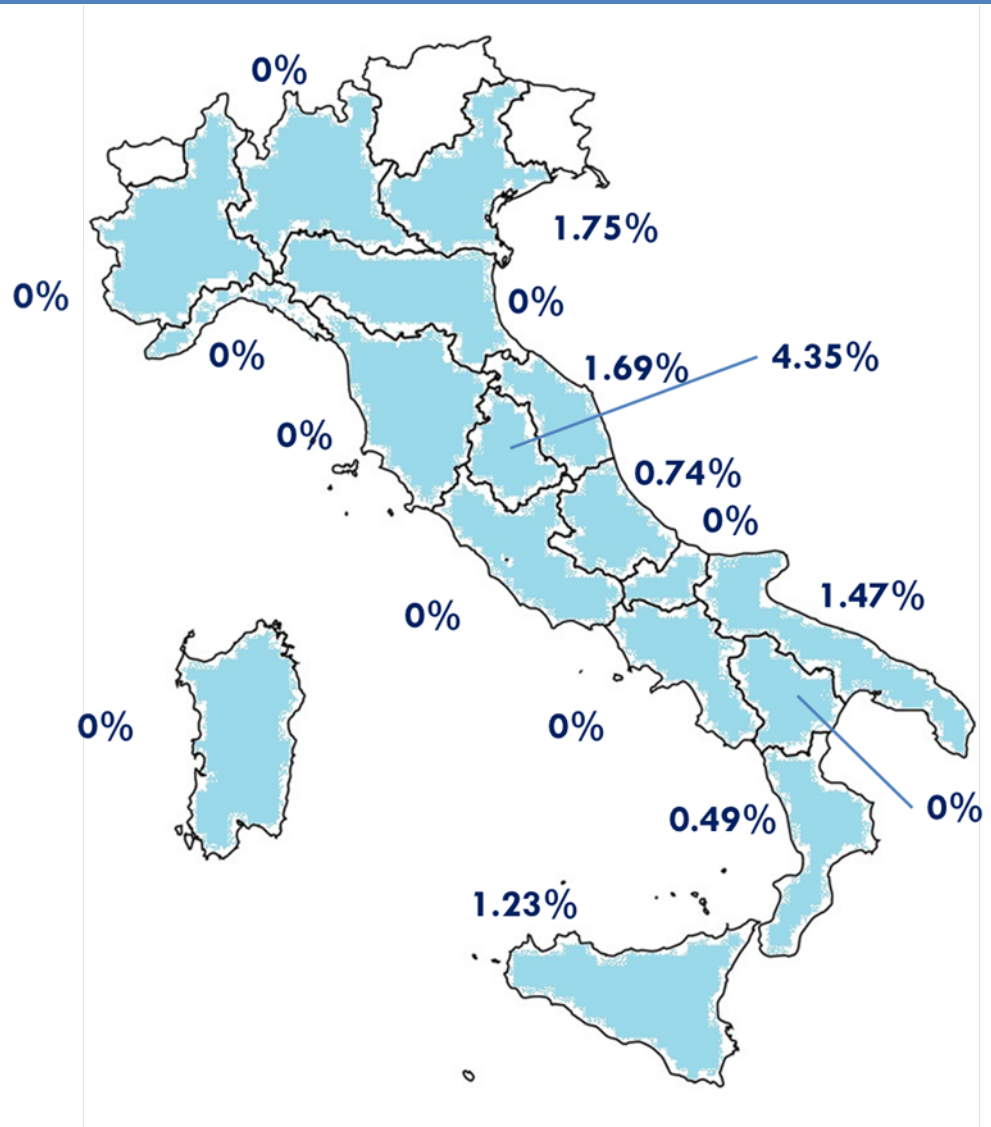
Count >10^4 CFU/L



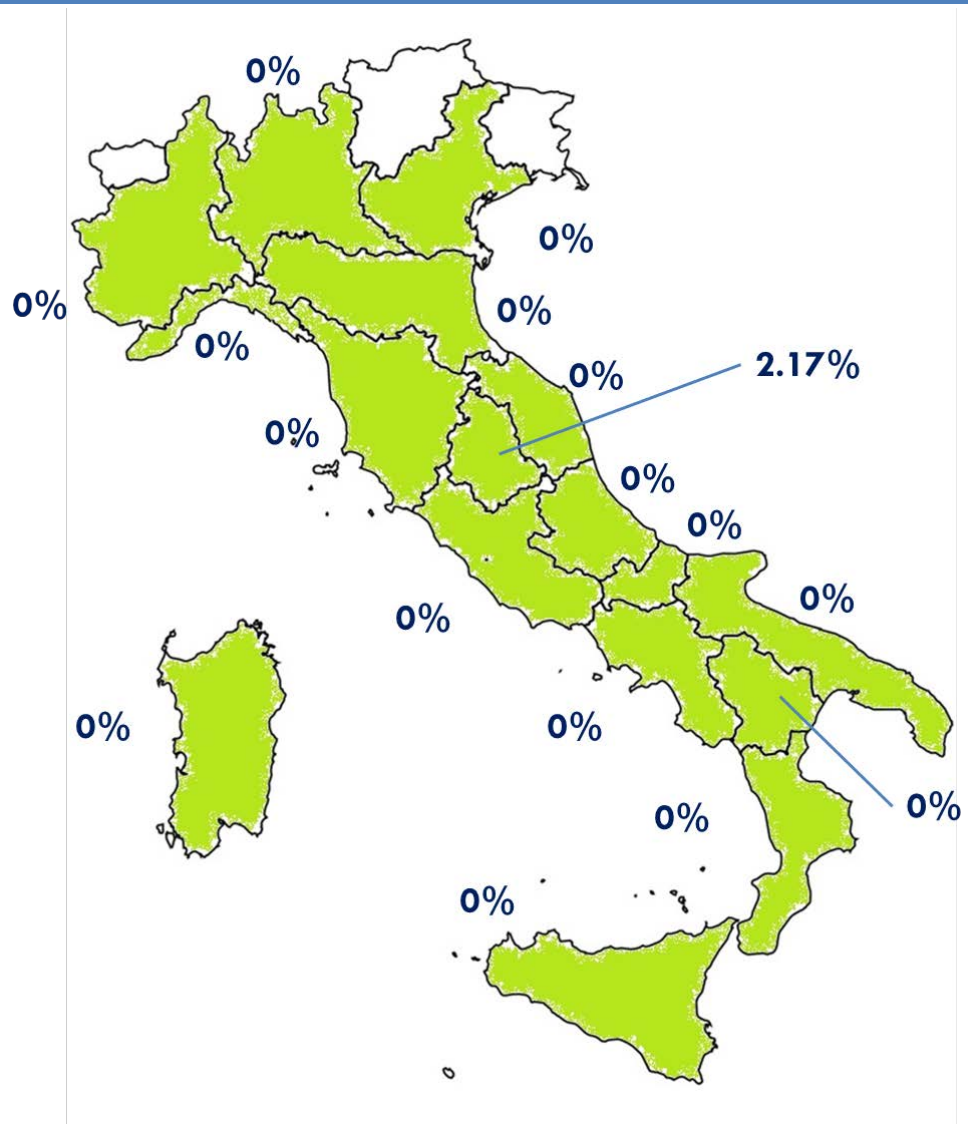
- ✓ 82/240 sites where completely negative
- ✓ 158/240 at least 1 positive sample (>10^2 CFU/L)



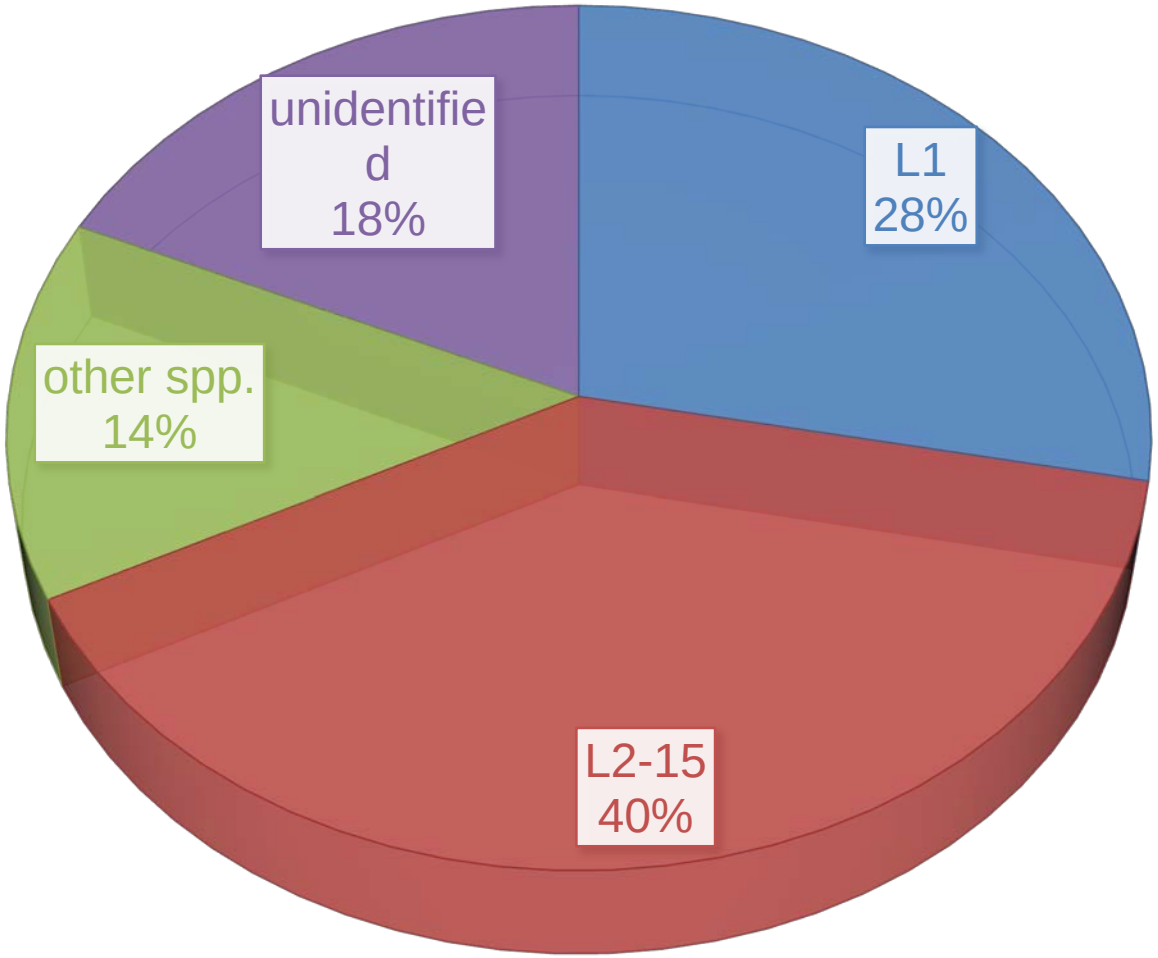
Count >10^5 CFU/L



Count >10^6 CFU/L

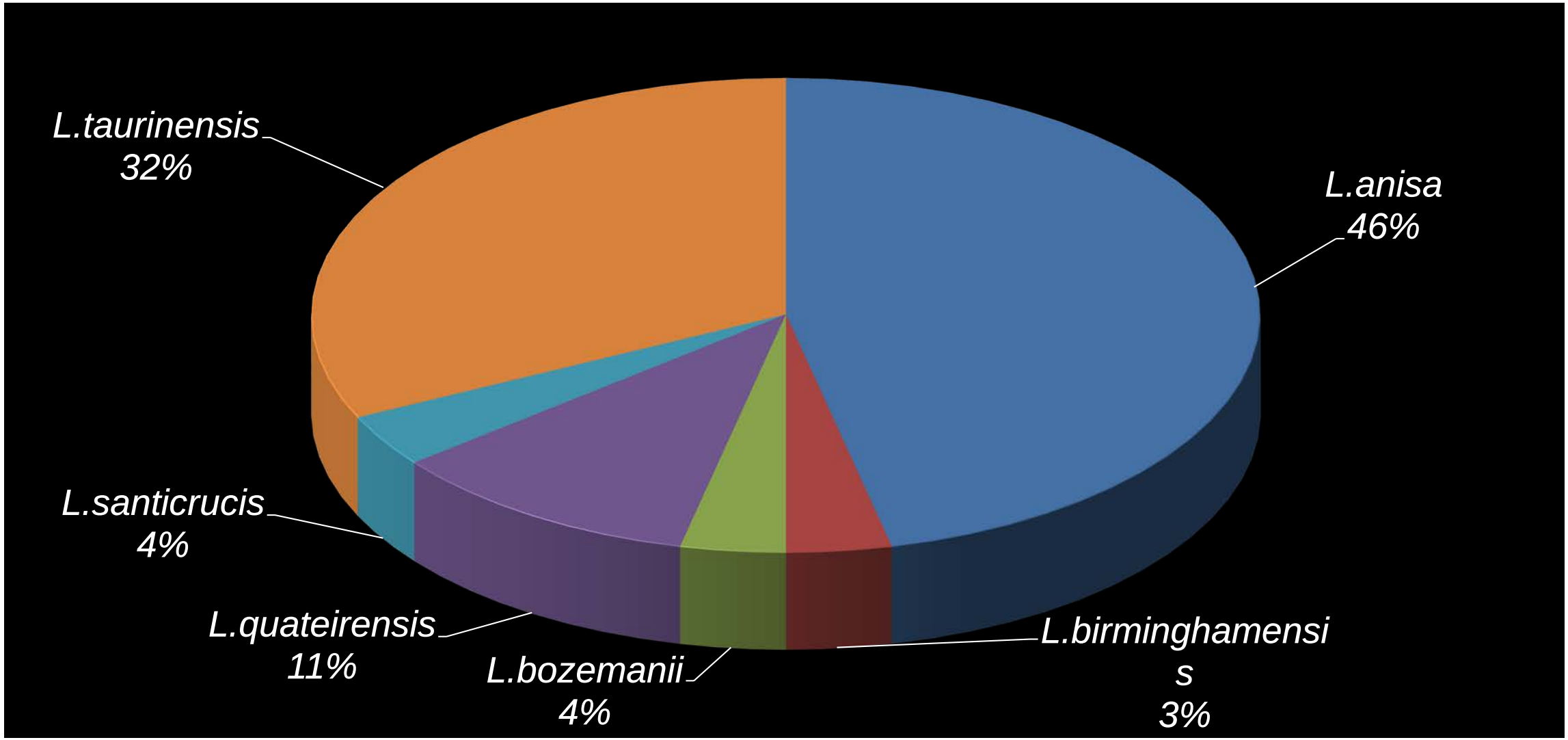


Latex identification (277 isolates)



	serotype				
Region	**L1**	**L2-15**	**Other**	**Unidentified**	**Total**
Abruzzo	9	11	1	4	25
Basilicata		5		9	14
Calabria	8	21	8	2	39
Campania	9	11	21	10	51
Emilia Romagna	3	3	2	1	9
Lazio	6	17	4	5	32
Liguria					
Lombardia	1	8	3	1	13
Marche		9			9
Molise	6				6
Piemonte					
Puglia	26	21	1	10	58
Sardegna	1			2	3
Sicilia	2	2		2	6
Toscana	2				2
Umbria	4				4
Veneto			1	4	5

mip gene sequencing (28 over 91 isolates)

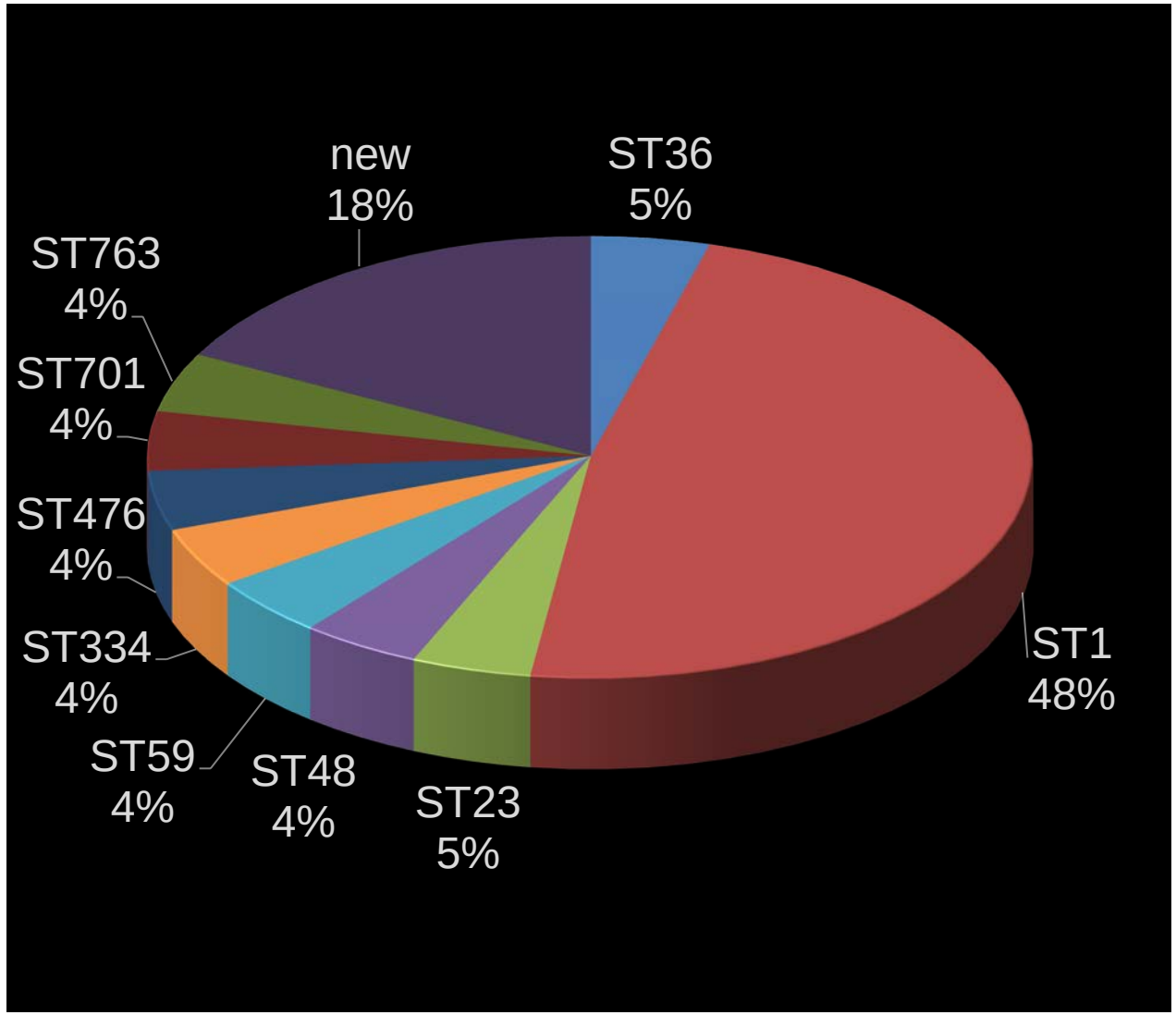


Species distribution

	pneumophila	*taurinensis*	*quateirensis*	*anisa*	*bozemanii*	*birminghamensis*	*santicrucis*
Abruzzo	10	2					
Basilicata	3	1	1				
Calabria	12	2		5			
Campania	5	1	1	6	1		
Lazio	4	1	1	1			
Molise	2						
Puglia	11	1		1		1	
Toscana	1						
Umbria	1						
Veneto		1					1

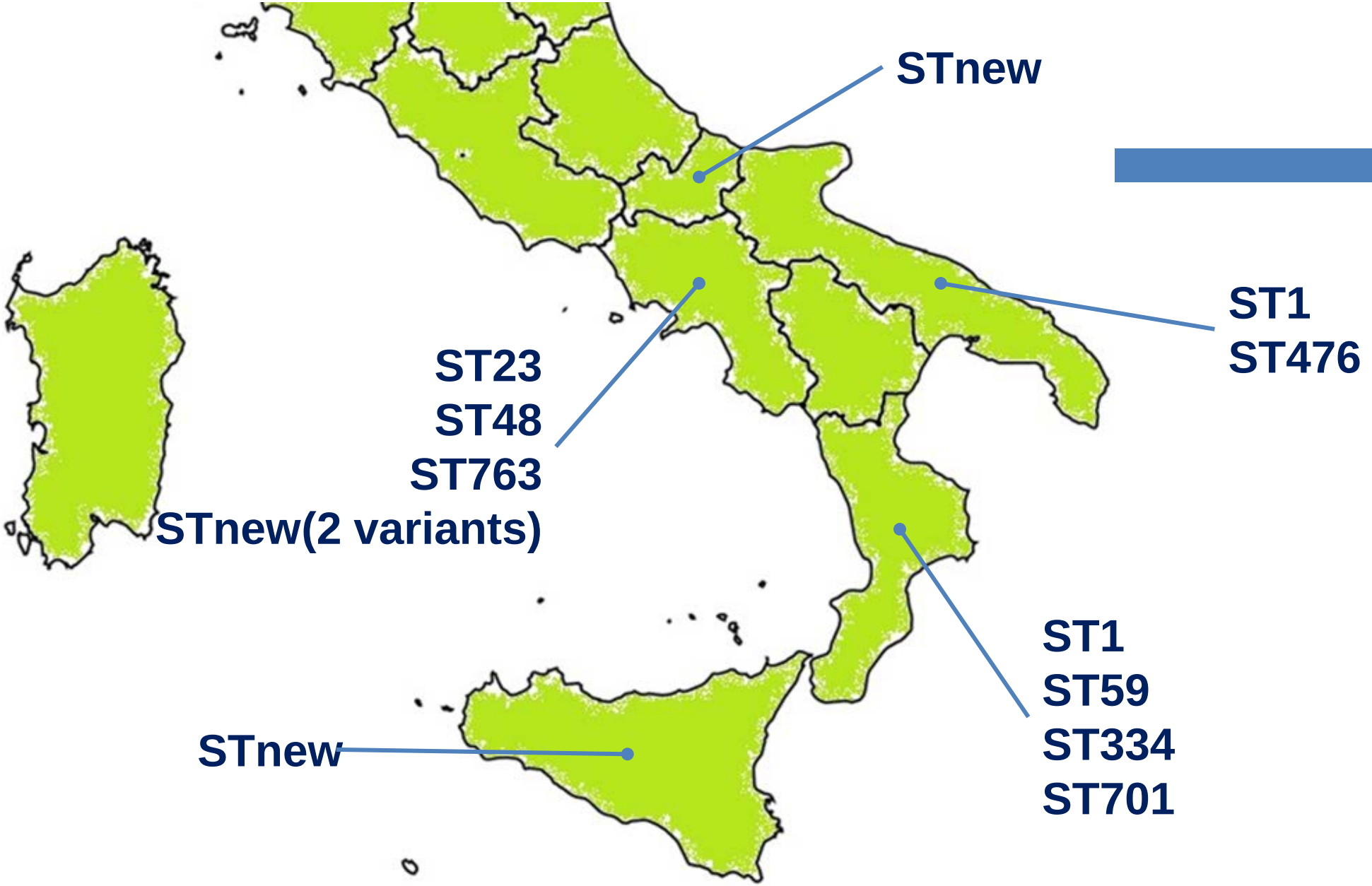
Sequence Based Typing *L. pneumophila* 1

- The Sequence Based Typing performed on 22 out of 77 L. pneumophila
- 4 new allelic variants, 1 for *fla*A locus and 3 for *pro*A locus.
- Allelic profile ST1 seems to be the most common in Southern Italy (11 out of 22)



New allelic variants

strain	*flaA*	*pilE*	*asd*	*mip*	*mompS*	*proA*	*neuA*	
6	0	3	18	13	2	1	6	Molise
90	4	7	11	3	11	0	9	Campania
127	1	4	3	1	1	0	1	Campania
191	1	4	3	1	1	0	1	Sicilia


STnew
ST1
ST476
ST23
ST48
ST763
STnew(2 variants)
ST1
ST59
ST334
ST701
STnew

Conclusion

- This study is the first detailed nationwide investigation on Legionella spp. in workplaces in Italy.
- 74% of positive samples exceeded 10^4 CFU/L indicating a growing risk of infection.
- In this study we also report for the first time the allelic distribution of L*. pneumophila* 1 in water supply systems, showing, at the moment, high prevalence of ST1 allelic profile

Perspectives

- Complete the identification of unidentified species
- Verify the new allele variants
- Complete the SBT profiles of *L. pneumophila* 1collection
- Whole Genome Sequencing of all collected *L. pneumophila* strains
  - Is anyone interested???

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