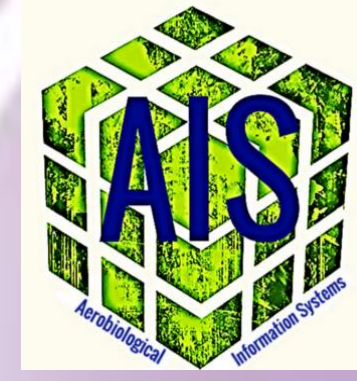




ANALYSIS OF PLANT OCCUPATION OF PUBLIC GREEN SPACES: A FRENCH CASE STUDY



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Introduction

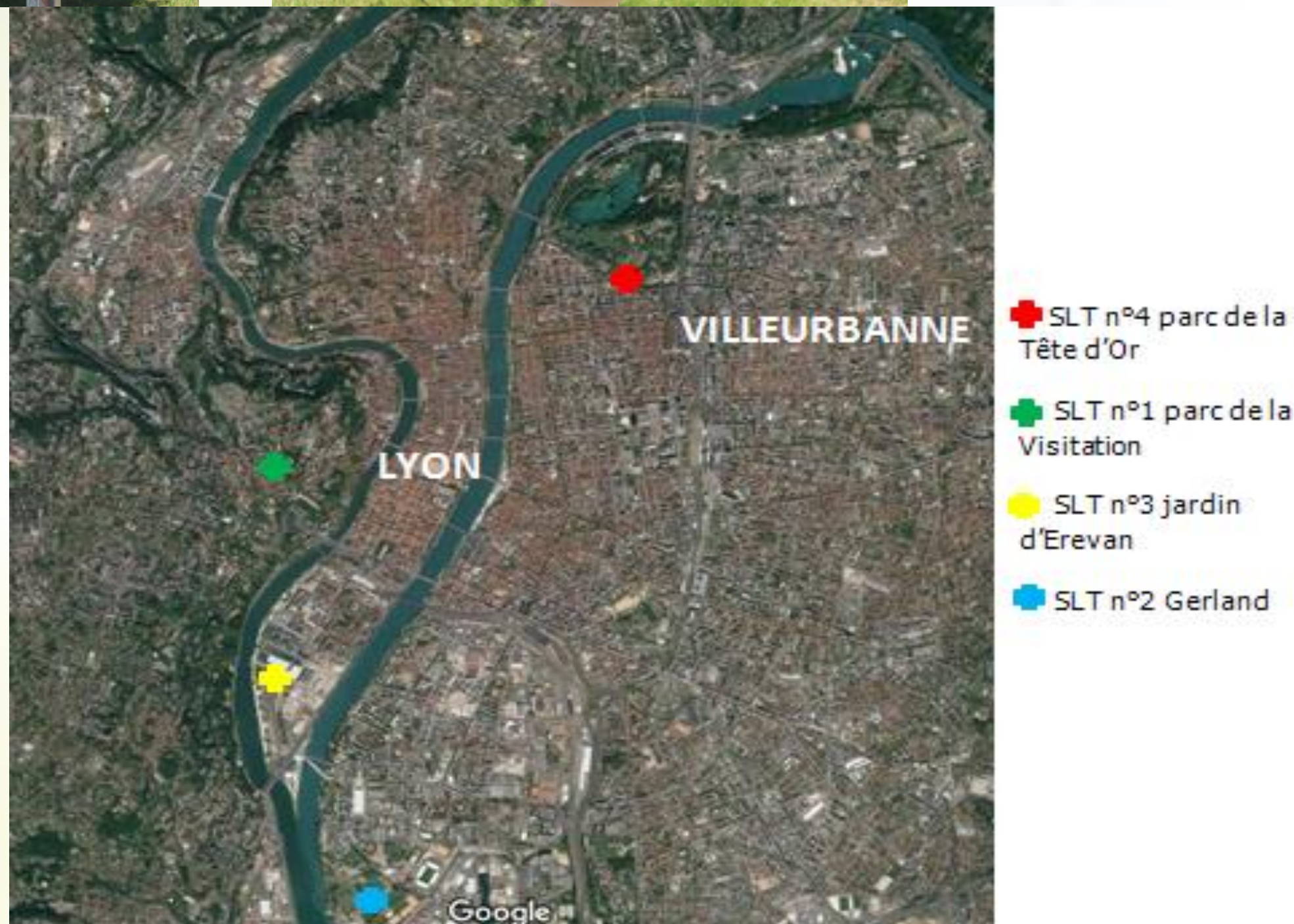
This study was carried out in the city of Lyon from March to June 2018. The objective of this study was to develop an index of source as well as an index of exposure to allergenic pollen trees in order to evaluate the content of pollens and allergens in 4 public green spaces. The results obtained will help to make recommendations for the use of trees in public green spaces to protect allergy sufferers. In France, 30% of adults and 20% of children are allergic to pollen (source ANSES). Sigma 2 like passive pollen trap (SLT) were used to analyze local pollen dispersion.

Material and method

SLT is composed on one hand of a transfer zone of air flow (high part) and on the other hand of a reception zone of particles by sedimentation (low part). Air flow goes through the trap in central zone, particles sediment and settle on a coated slide disposed in the lower part of the trap. The SLT traps were positioned at about 70 cm above ground, in close proximity to public gardens. Every week, the slide containing biological particles was changed and sent to the laboratory to be analyzed by optical microscopy.



SLT location in Lyon



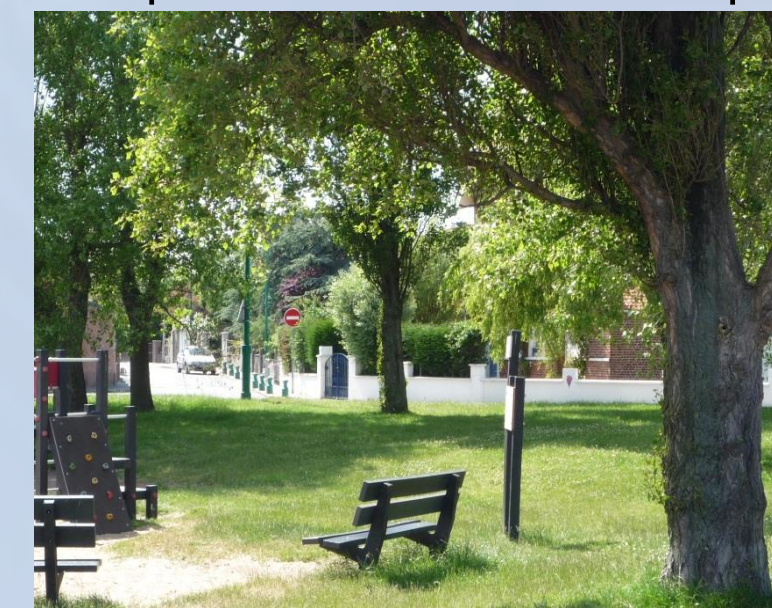
Allergy potency

The allergy potency of a plant species is the ability of its pollen to cause an allergy to a significant part of the population. The allergy potency can be:

- **Low or negligible** : This means that a very large amount of pollen is needed to trigger an allergy and this applies only to the most sensitive people. There is no problem to plant them in urban garden.
- **Moderate** : These species may be present locally to bring diversity into plantations, but they should not represent the majority of planted species.
- **High** : A few number of pollen is enough to cause an allergic reaction. This species cannot be planted in urban places.



Birch tree



Plane tree

Index (according to Cariñanos)

- **Index of source** : it takes into account the allergy potency and the number of species.

$$\text{Index of source} = \frac{\text{Allergy potency} * \text{Number of species}}{10}$$

- **Index of exposure** : it takes into account the allergy potency of the species and the number of pollen grains.

$$\text{Index of exposure} = \frac{\text{Allergy potency} * \text{Number of pollen grains}}{1000}$$

Results

An example of the results is presented here in the figure below with the index of source, the index of exposition and some recommendations for each allergenic taxa for all the different SLT localized in Lyon in the different parks.

Pollen trap	SLT n°1 Parc de la Visitation			SLT n°2 Parc de Gerland			SLT n°3 Jardin d'Erevan			SLT n°4 Parc de la Tête d'Or		
	Index of source	Index of exposure	Re	Index of source	Index of exposure	Re	Index of source	Index of exposure	Re	Index of source	Index of exposure	Re
Birch	8	11	N	40	25	L	164	37	R	21	8	N
Ash	26	13	N	55	11	N	42	14	N	125	7	L
Plane tree	92	17	L	351	29	L	199	20	L	348	106	R
Oak	9	11	N	33	9	N	26	11	N	77	10	N
Hornbeam	7	2	N	12	3	N	5	2	N	52	1	N
Cypress	5	20	L	7	7	N	3	6	N	6	5	N
Willow	0	0.2	N	13	0.5	N	6	0.4	N	8	0.3	N

The results showed that there are many allergenic species in these parks, such as cypress, birch, plane tree, hornbeam, ash, etc. We found different results depending on the species in the different parks.

For example in the "Jardin d'Erevan" we must stop planting birch tree and in the "Parc de la Tête d'Or" we must remove the plane tree which are present in big quantities (high index of exposition and index of source > 100).

This extensive use of allergenic species indicates that people in charge of urban vegetation should be informed on the health impacts of some plants and on the species that should be avoided. We need to avoid the local pollen sensitization by stopping planting allergenic species with a **high** or **moderate** allergy potency in green areas.

Legend :
Re = Recommendations
N = Do Nothing
L = Limit the species
R = Remove the species

Conclusion

Green areas of Lyon contain many allergenic species indicating that health issues have not been taken into consideration so far, when choosing the species to be planted, this should be corrected. To enable to people in charge of urban green areas in France to make good choices, information is now available to everybody on the allergy potency of many plant species and a guide is produced with recommendations on which plants to avoid or prefer. <http://www.vegetation-en-ville.org/que-faire/le-potentiel-allergisant/>

Reference Cariñanos P., Casares M., Quesada JM., "Estimating the allergenic potential of urban green spaces: A case-study in Granada, Spain", 2014
 Avis de l'ANSES, Rapport d'expertise collective, "État des connaissances sur l'impact sanitaire lié à l'exposition de la population générale aux pollens présents dans l'air ambiant", 2014

In relation to this presentation, we declare that there are no conflicts of interest