

Case study France: Analysis of plant occupation of public green spaces



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Introduction

AIS Life is a European project which brings together three countries (France, Austria and Italy).

The project's aim was to develop an information base for policy on environment and health, in terms of improved management of pollen-related allergic respiratory diseases in Europe. Within this project, a case study has been implemented in France in order to provide recommendations for plant use in public green areas. The specific objectives of this case-study are to assess pollen counts and allergen content in public gardens and on the basis of the obtained results to formulate recommendations in order to protect allergy sufferers. In France, 30% of adults and 20% of children are allergic to pollen (ANSES source). Sigma 2 like passive pollen trap (SLT) were used to analyze local pollen dispersion.

This study took place from the beginning of March 2015 to the end of June 2016 (during the periods of pollination) in three parks of Paris and three parks of Lyon.

Materials and methods

o Pollen proximity measurement

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 come on a coated slide disposed in the lower part of the trap.

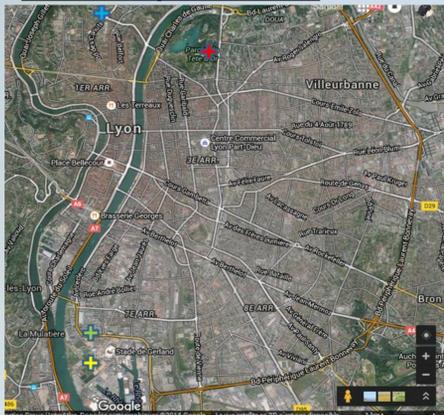
The SLT traps were positioned at about 70 cm above ground, in close proximity to public gardens.

Every day, the slide containing biological particles was changed and sent to the laboratory to be analyzed by optical microscopy.

The SLT helps to daily measure the quantity of particles (pollens ...) present in the air.



o Pollen traps location



SLT Tête d'Or
SLT Croix Rousse
SLT Gerland
Hirst Lyon Gerland

Lyon



SLT Choisy 1 et Choisy 2
SLT Jardin des plantes
SLT Dalpayrat
Hirst Paris Pasteur
Hirst Paris LHVP

Paris

o 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

o Index

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

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

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

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

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 allergic taxa for one SLT localized in Lyon in the parc de la Tête d'Or.

Pollen trap Taxa	SLT Tête d'Or Index of source	SLT Tête d'Or Index of exposition	Recommandations
Birch	23	9	l
Hornebeam	38	6	l
Cypress	6	52	l
Oak	65	17	n
Ash	82	18	l
Poplar	10	3	n
Plane tree	83	87	r
Willow	5	1	n

The results showed that there are many allergenic species in this parc, such as cypress, birch, plane tree, hornebeam, ash, etc. We found the same kind of results for the other parcs of the study in Paris and in Lyon.

This extensive use of allergenic species indicates that those responsible for the urban vegetation should be informed on the health impacts of some plants and on the species that should be avoided.

For example 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 > 80) and limit the plantation of some other species such as birch, hornebeam, cypress and ash.

We need to avoid the local pollen sensitization by stopping planting allergenic species with a **high** or **moderate** allergy potency in green areas.

Legend :

n = do nothing

l = limit the species

r = remove the species

Conclusion

Green areas of France 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 repaired. To enable those responsible for the urban green areas in France make proper 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

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