

Correlation between *Platanus* pollen grains and Pla a 1 allergen levels in Madrid, Spain

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Background:

Platanus hispanica (London plane, or London planetree) is a tree which belongs to the botanical family *Platanaceae* and is widely planted in Madrid and in many other cities. Before its introduction, sensitization to its allergens was low. However, in recent year, sensitization to the allergens of this tree species has increased dramatically. Pla a 1 is a major allergen recognised by most *Platanus* allergic patients. It has a molecular weight of 18 kDa and sequence homology with invertase inhibitors. Pla a 2 (43 kDa) is also an important allergen and has homology with Polygalacturonase.

Objectives:

To analyze the correlation between *P. hispanica* pollen grains and Pla a 1 concentrations in Madrid, Spain, during the 2010 pollen season (March to April 2010).

Methods:

First-type volumetric trap and Burkard Cyclone samplers were used for pollen counts and aeroallergen capture, respectively. The quantification of Ole e 1 allergens was performed using specific 2-site antibody ELISA (Bial, Bilbao, Spain).

Results:

Analysis of the data showed a correlation between pollen grains and Pla a 1 of $r=0.41$; $p < 0.001$ (Pearson rank test). Main allergenic activity during 2010 was detected April 7th (pollen count: 762 grains/m³; Pla a 1: 0.35 ng/m³/d). The pollen season lasted from April 5th to May 16th. The mean pollen count was 230 grains/m³/d.

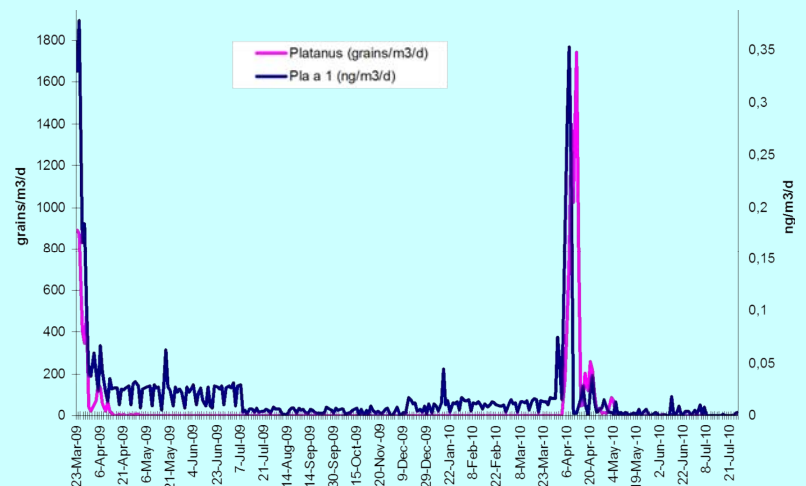
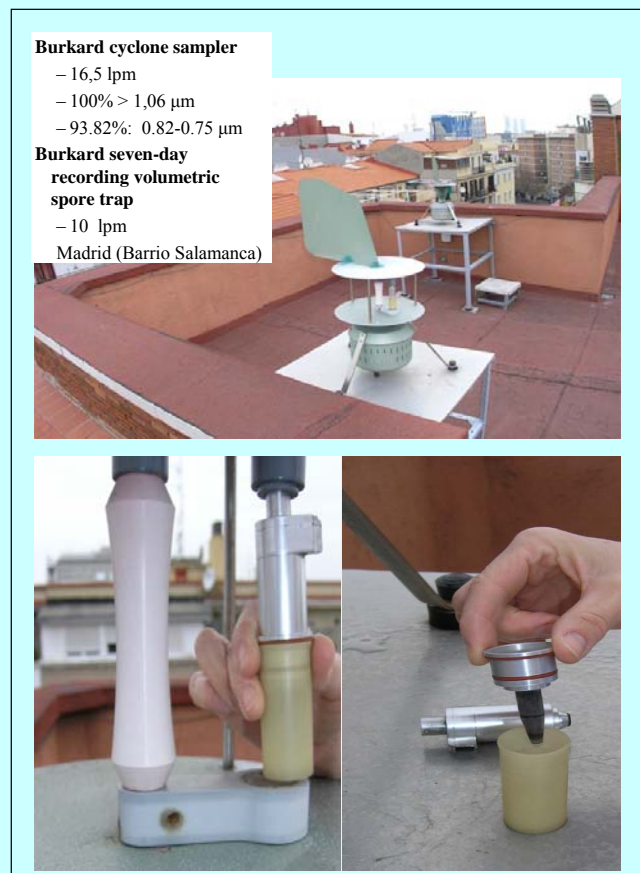


Fig. 2. Pla a 1 appearance and *P. hispanica* pollen counts (2009-2010)



Burkard cyclone sampler
 – 16,5 lpm
 – 100% > 1,06 µm
 – 93,82%: 0.82-0.75 µm
Burkard seven-day recording volumetric spore trap
 – 10 lpm
 Madrid (Barrio Salamanca)

Fig. 1. Hirst-type volumetric trap and Burkard Cyclone samplers. Particles were collected directly into a 1.5 mL Eppendorf vial.

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Conclusions:

1. Few studies have addressed Pla a 1 levels in ambient air in European cities.
2. The atmospheric presence of Pla a 1 is detected during the period of *P. hispanica* pollen grains in the air, although the correlation coefficient with pollen counts is not high.
3. The number of pollen detected in the city may explain the steady increase of sensitization to this tree species in Madrid.

Reference:

Arilla MC, et al. Development of a sandwich-type ELISA for measuring Pla a 1, the major allergen of *Platanus acerifolia* pollen. *Int Arch Allergy Immunol.* 2005 Oct;138(2):127-33.