



Bilan de l'étude HIALINE sur la mesure des allergènes de l'air

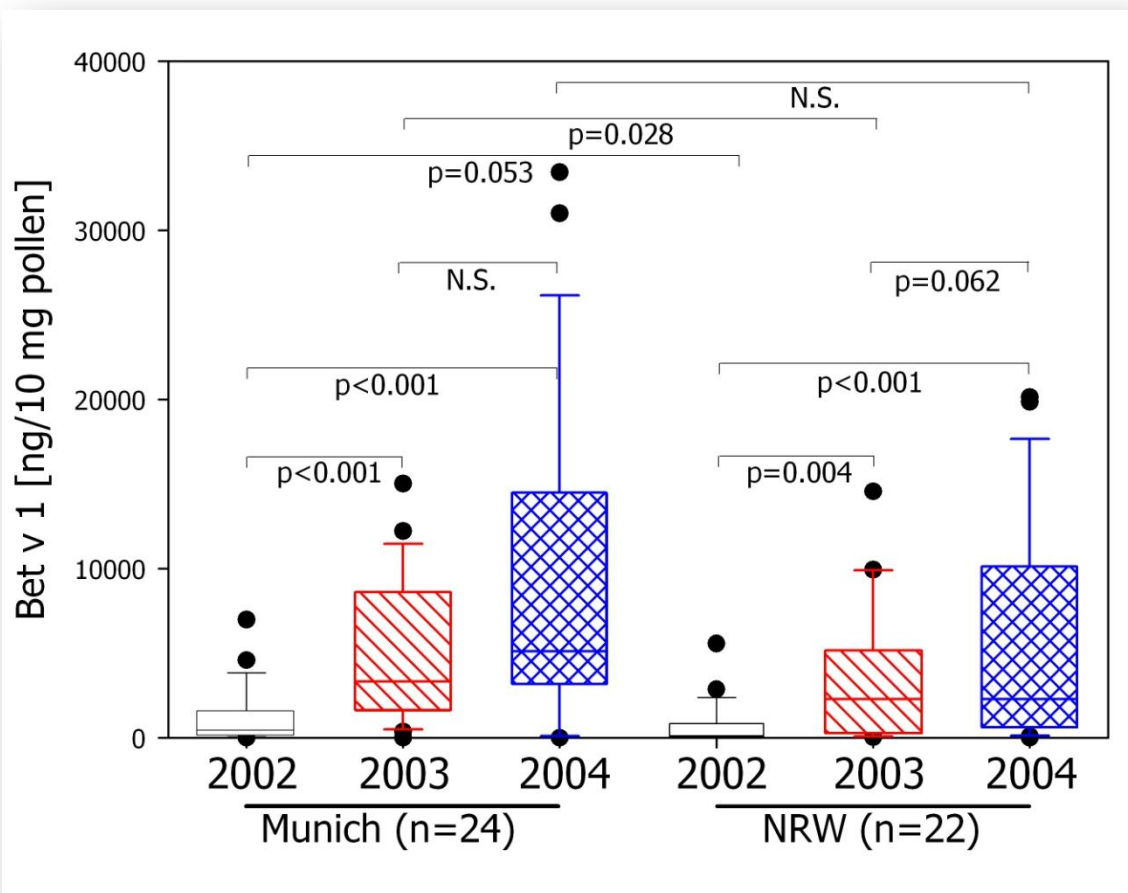
Buters, J.¹, C. Galán², M. Thibaudon³, M. Smith⁴, R. Brandao⁵, C. Antunes⁵, R. Albertini⁶, L. Grewling⁷, A. Rantio-Lehtimäki⁸, S. Celenk⁹, M. Sofiev¹⁰, I. Sauliene¹¹, S. Jäger¹², U. Berger¹², & L. Cecchi¹³

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HIALINE



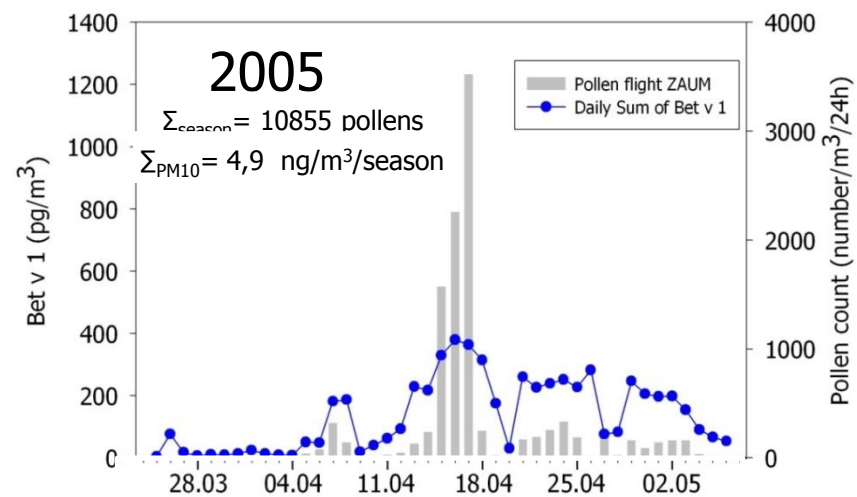
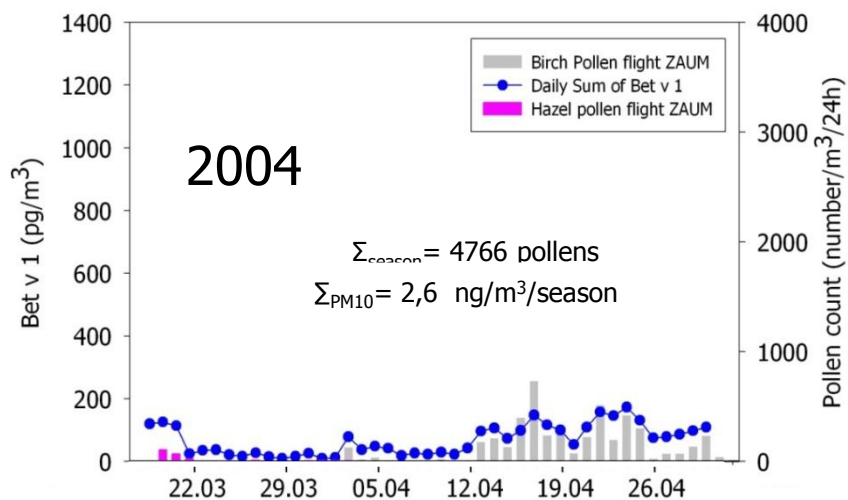
Quantité d'allergènes / Quantités de pollens



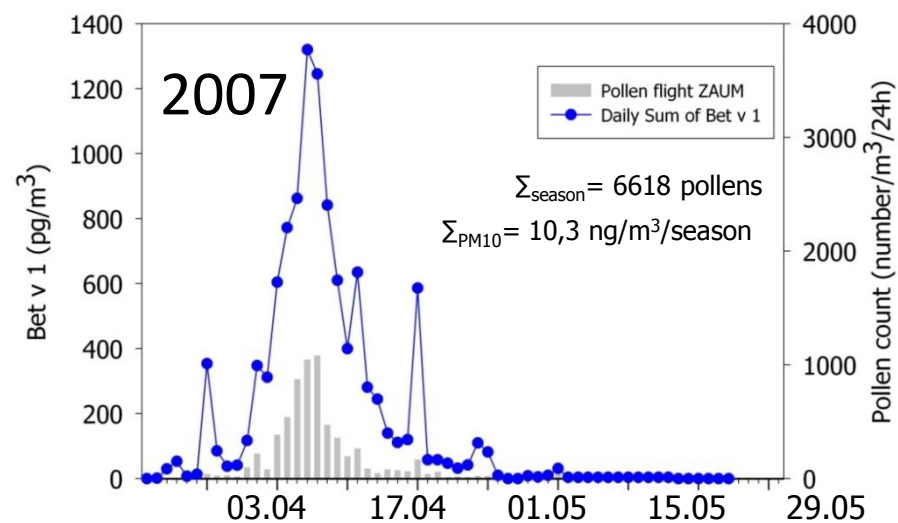
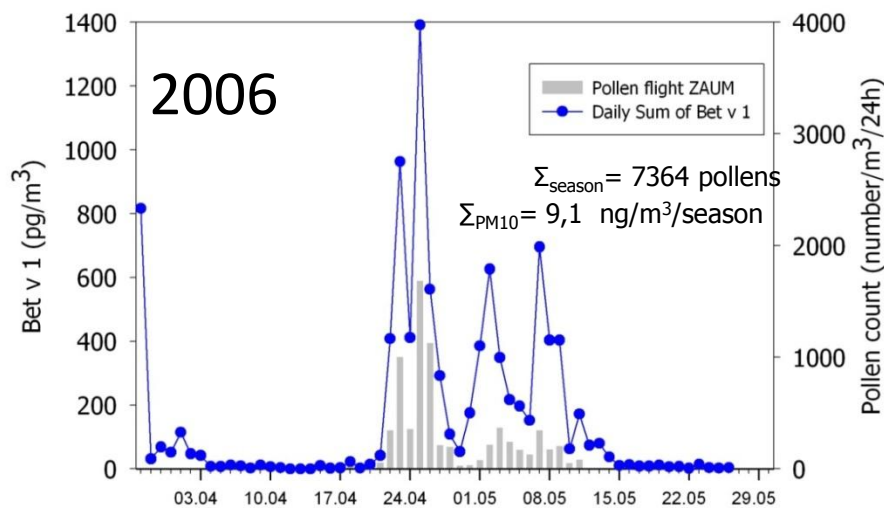
Buters et al., Int Arch Allergy Immunol, 2008

Buters et al., Allergy, 2010

Quantité d'allergènes / Quantités de pollens

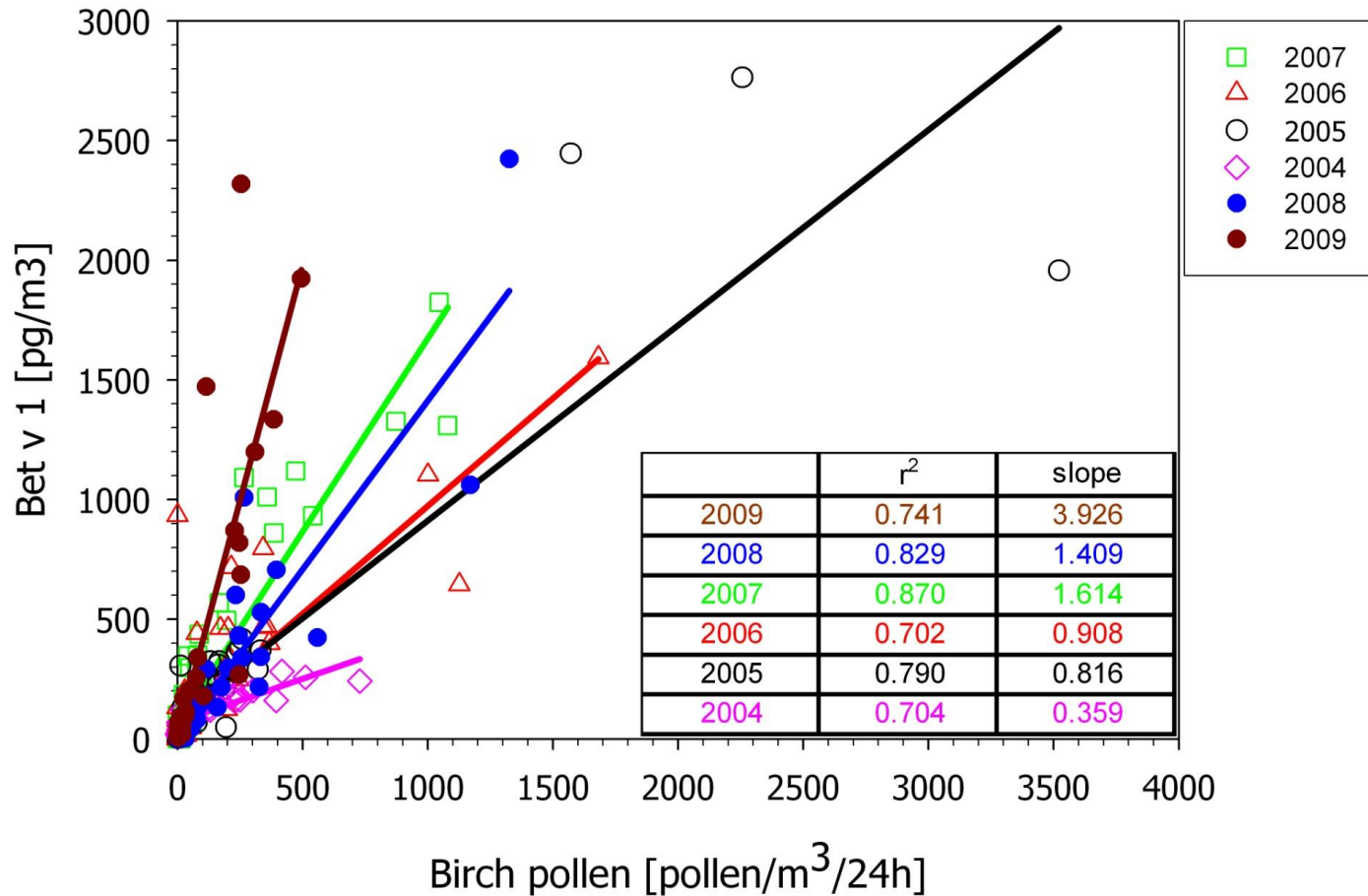


Quantité d'allergènes / Quantités de pollens

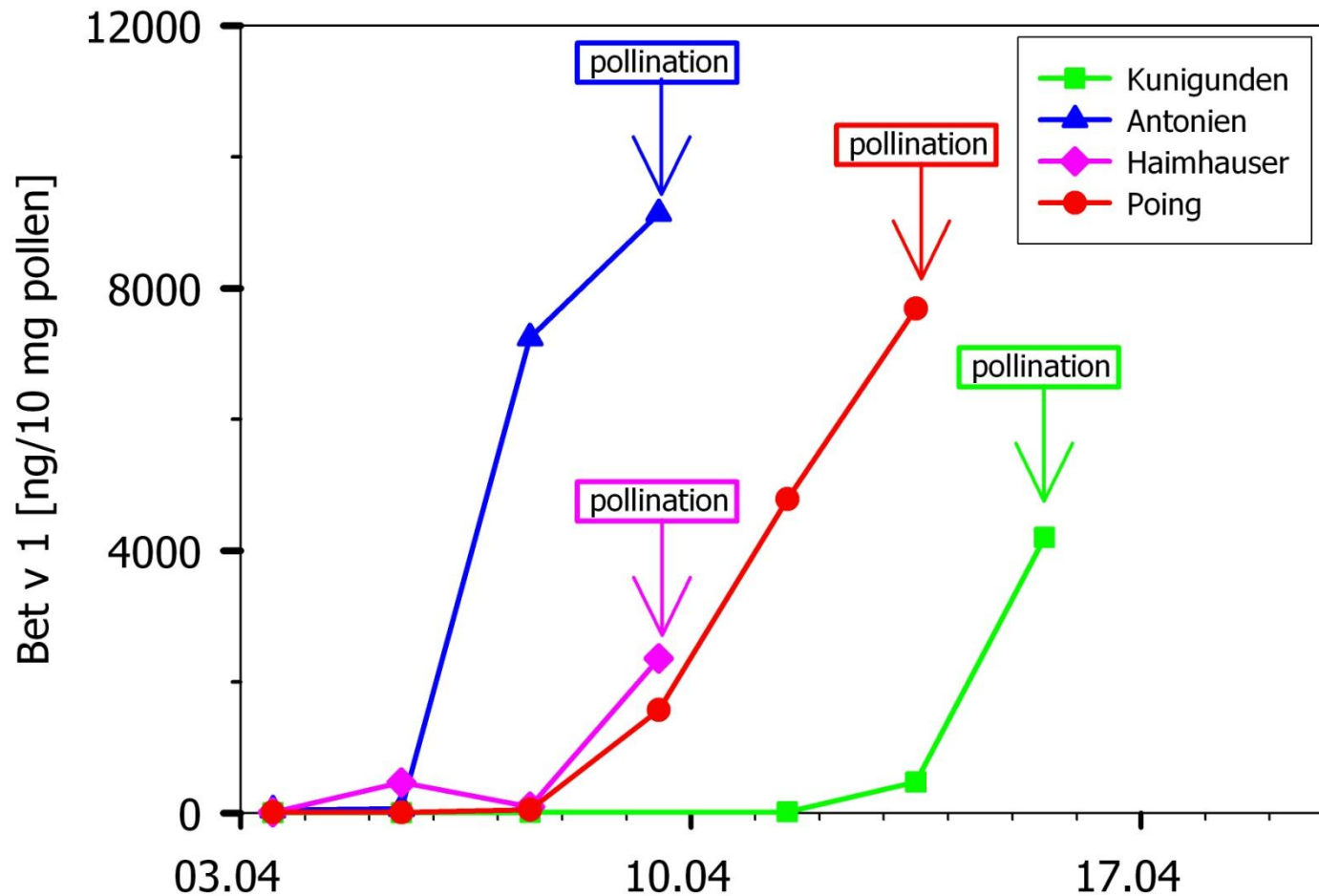


Corrélation entre pollens et allergènes

Munich, Birch 2004-2009

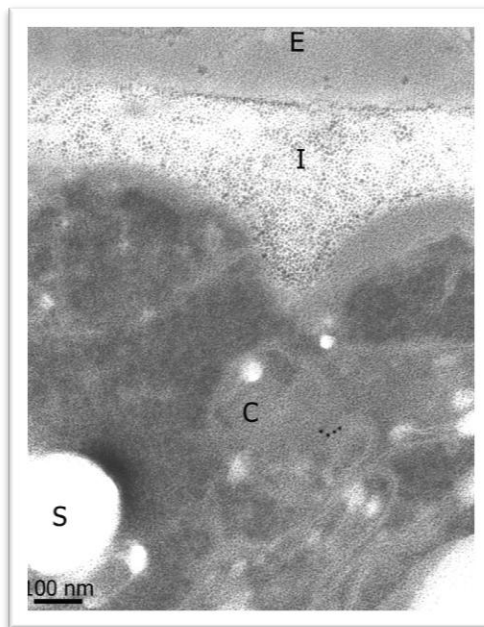


Explication de la variation du potentiel allergène des pollens de bouleau

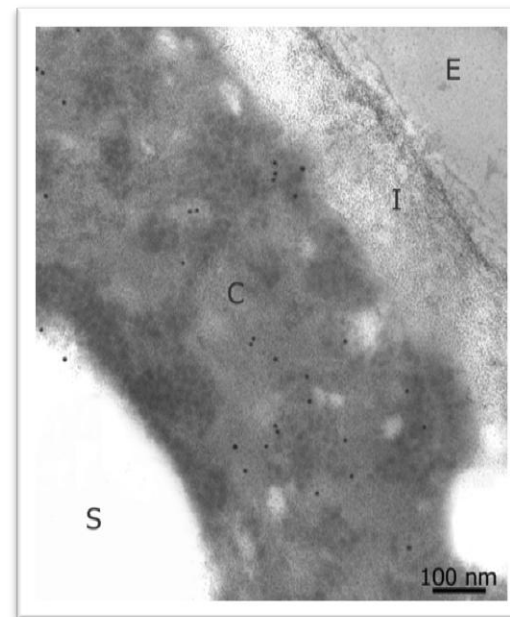


Production de Bet v 1 juste avant la pollinisation

- Bet v 1 was stained with a biotinylated antibody 2E10 and counterstained with a 80 nm-gold particle labelled anti-biotin antibody -



29.3.2005



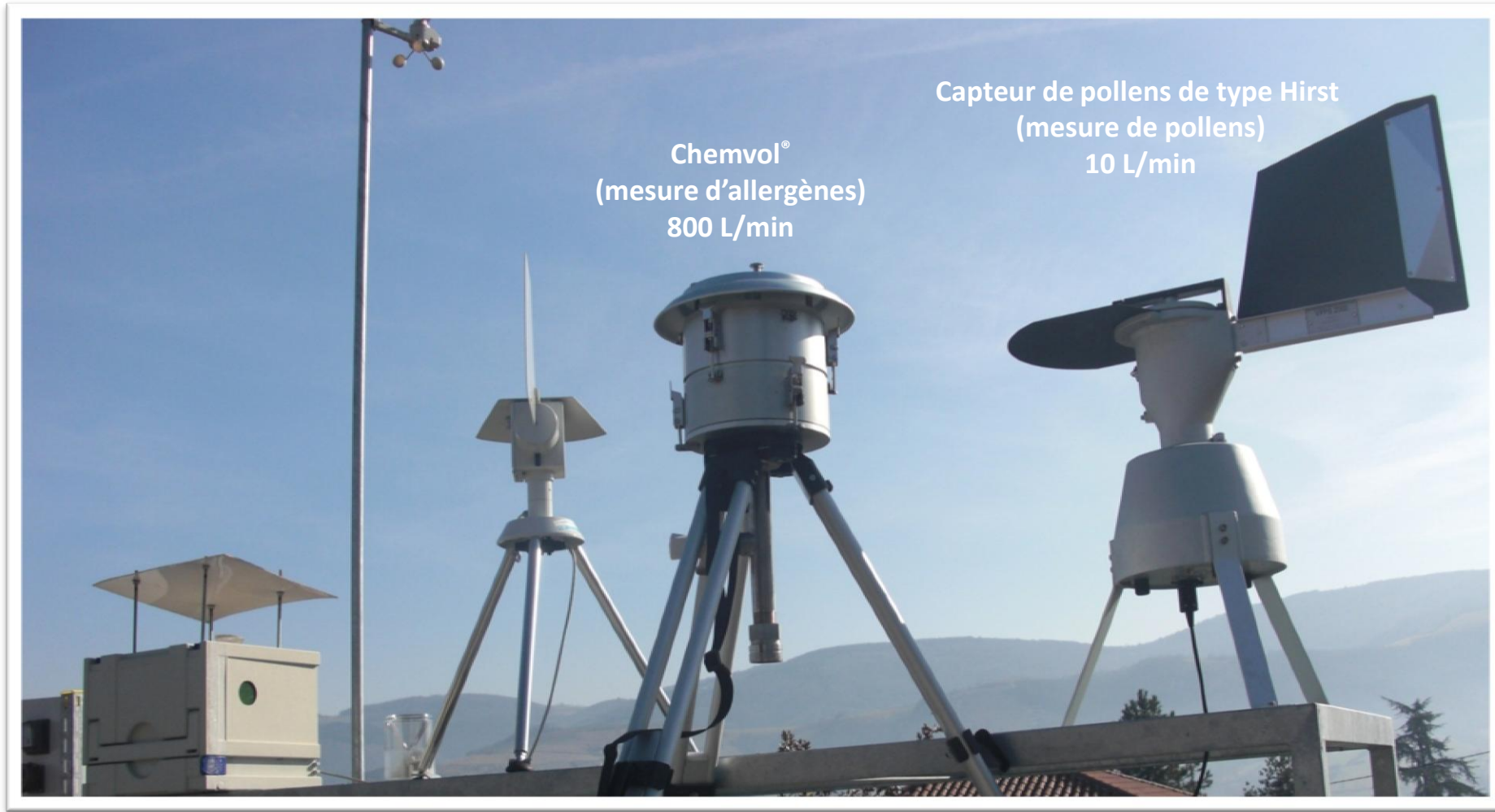
12.4.2005

Pollen from Antonienstrasse, Munich

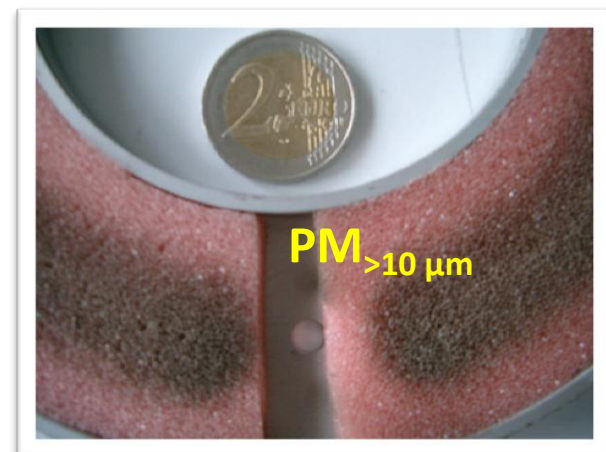
Si l'on considère les pollens de différents arbres de la même espèce, de différentes régions, de différentes années, et en fonction des jours, la libération de Bet v 1 par grain de pollen peut varier sensiblement.

Il est possible de dire qu'il peut y avoir jusqu'à 10 fois plus d'allergènes d'un grain à l'autre.

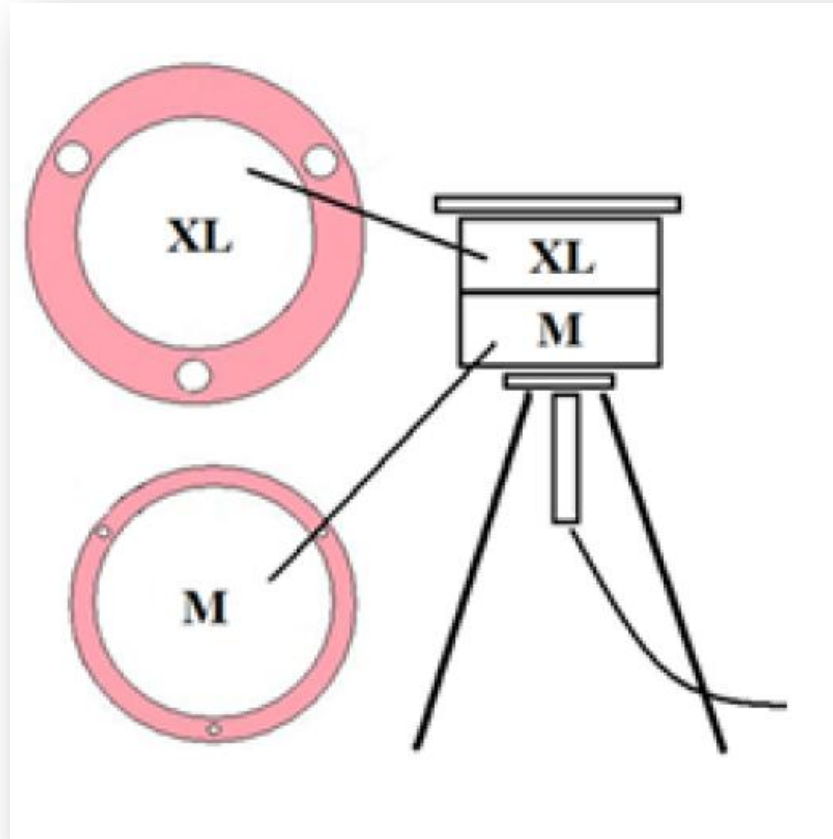
Dispositif au RNSA



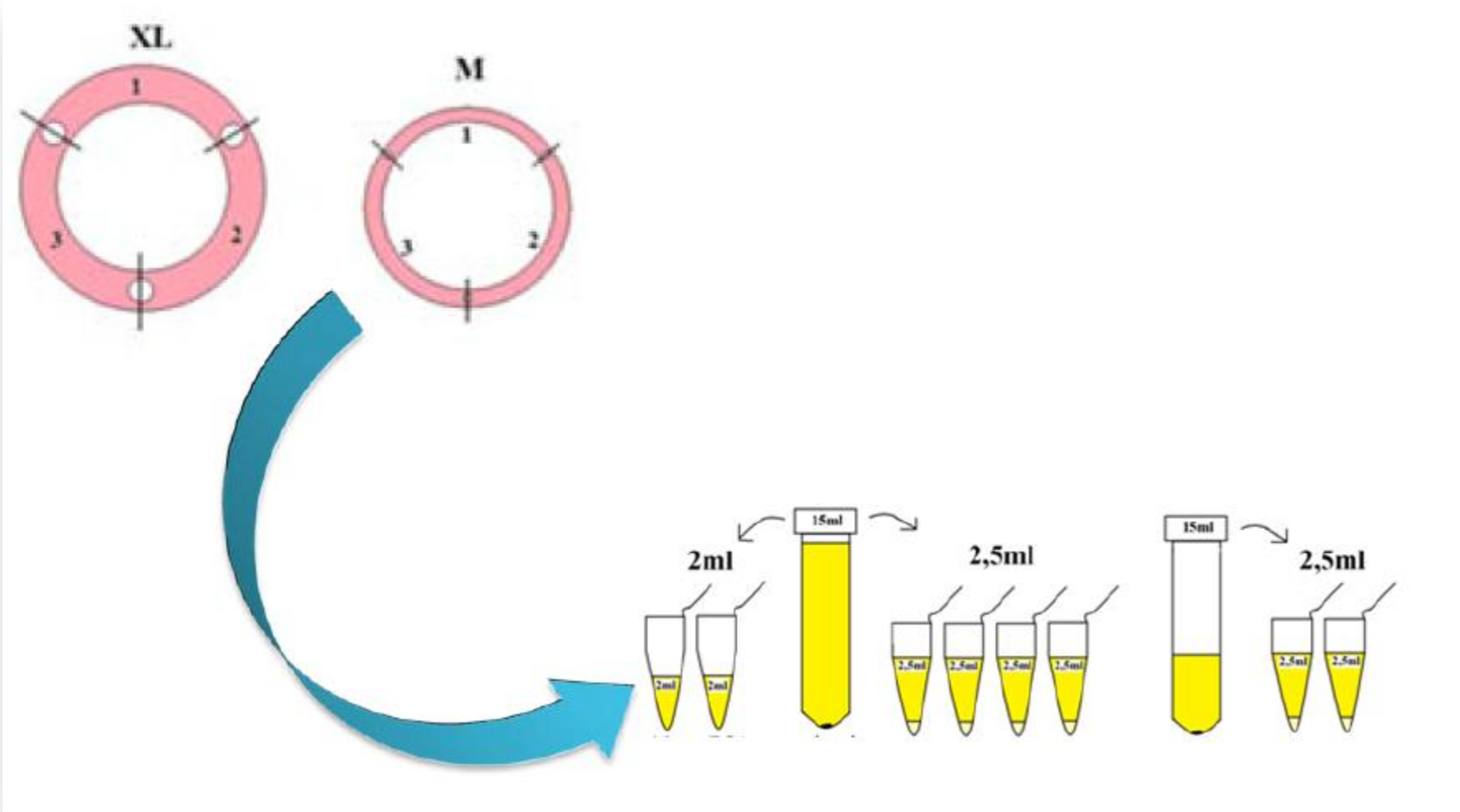
CHEMVOL



CHEMVOL



Méthode

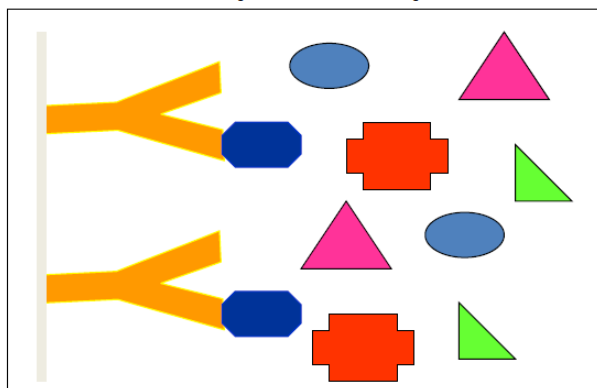


Quantification of Major Allergens: Monoclonal Antibody Based Two-Site Binding Assays

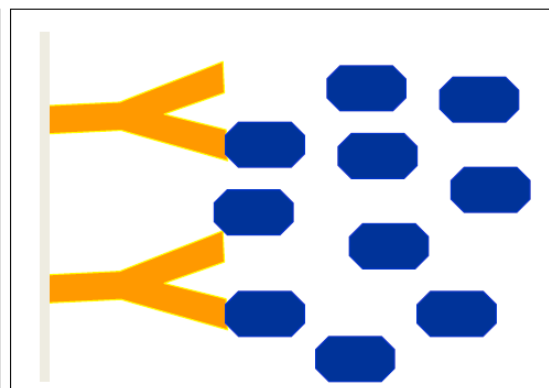


1st step: Coating with
capture antibody

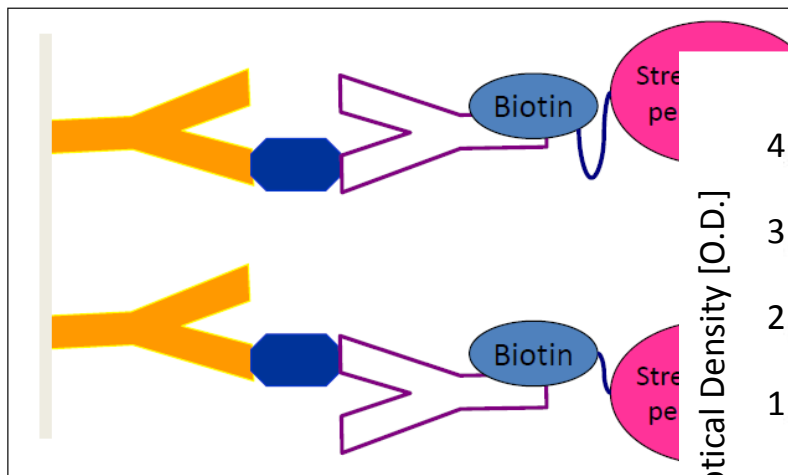
2nd step: Add sample



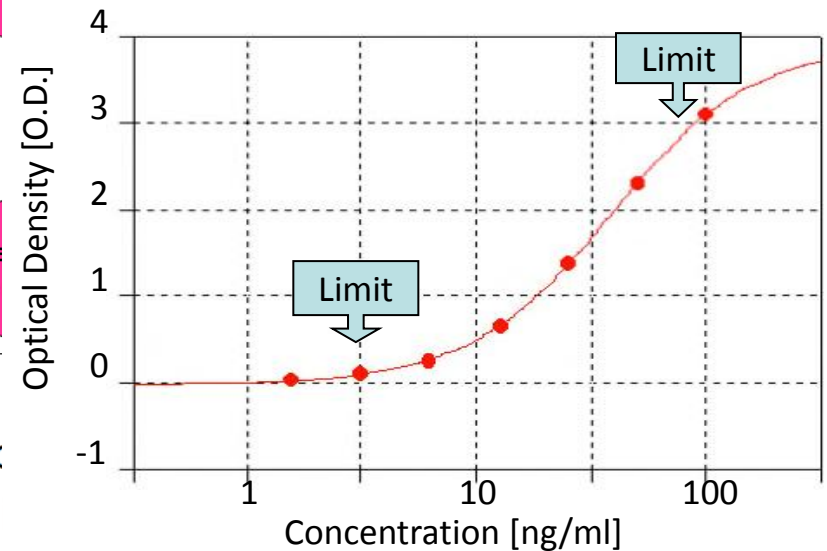
or reference



3rd step: Detection of bound molecules

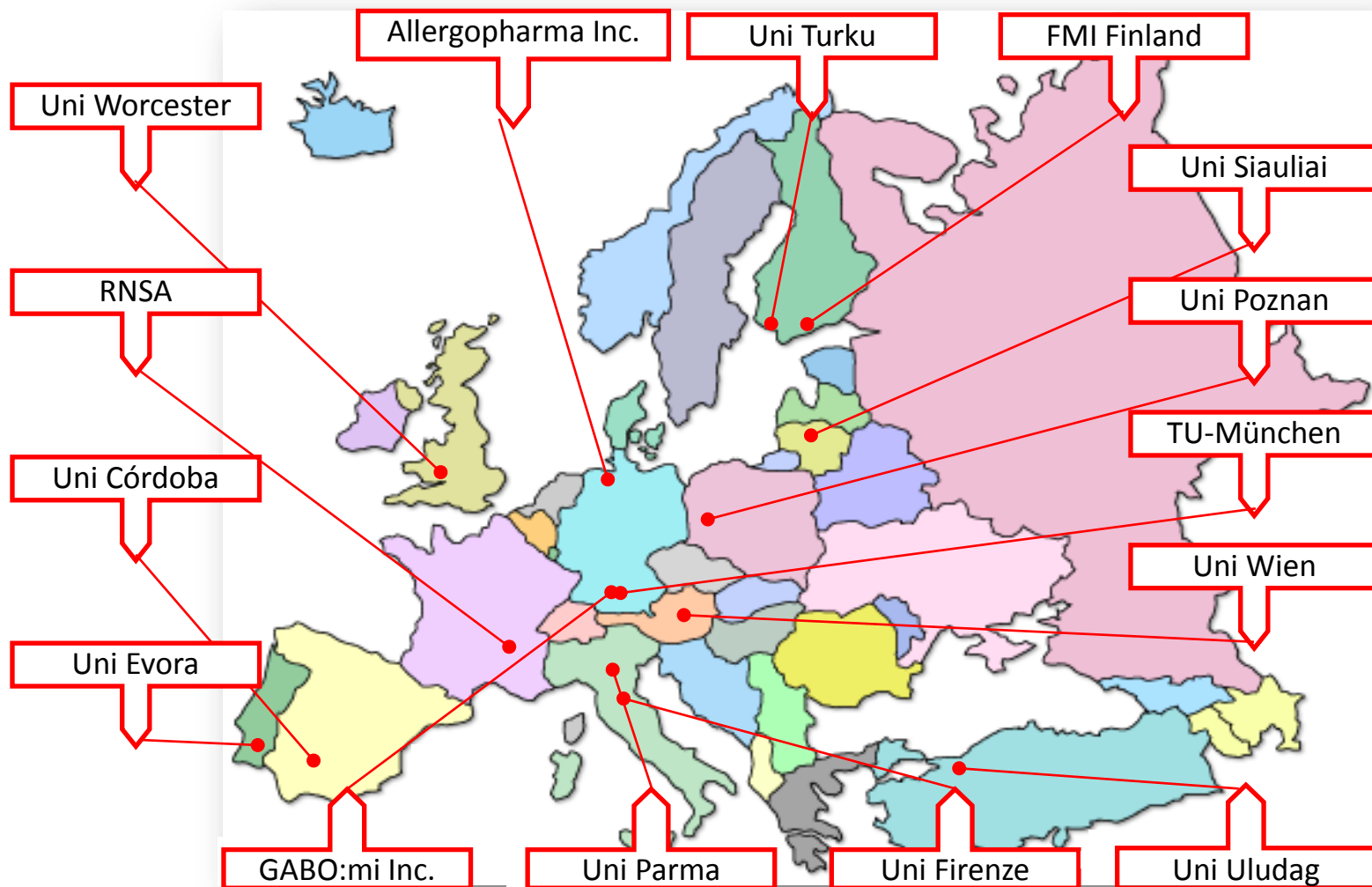


Bet v 1-Sandwich ELISA calibration curve

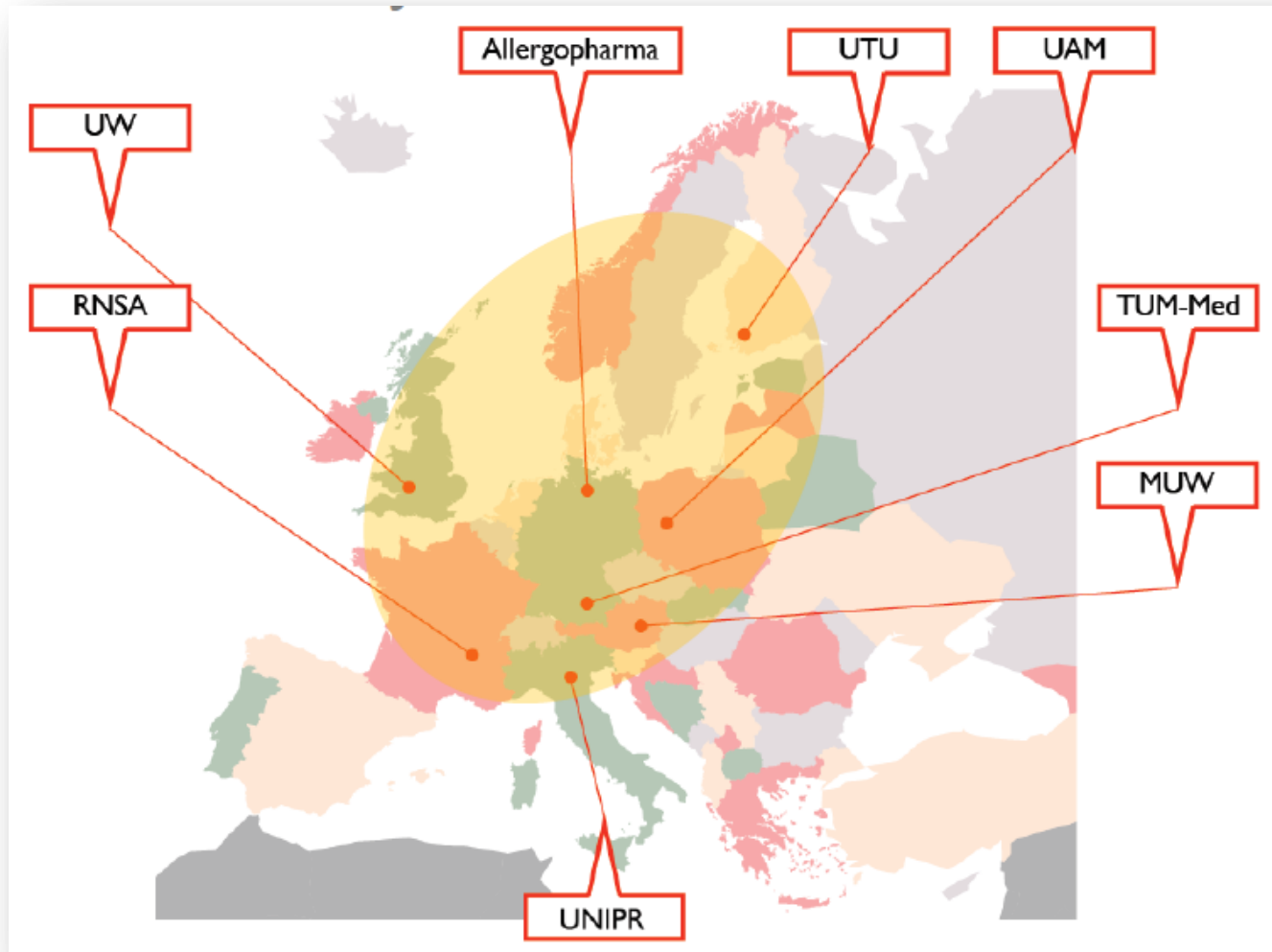


Sandwich ELISAs measure the amount of antigen in a sample using two layers of antibody (i.e. capture and detection antibody).

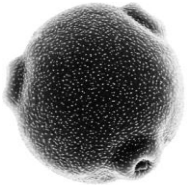
Health Impacts of Airborne Allergen Information Network (HIALINE)



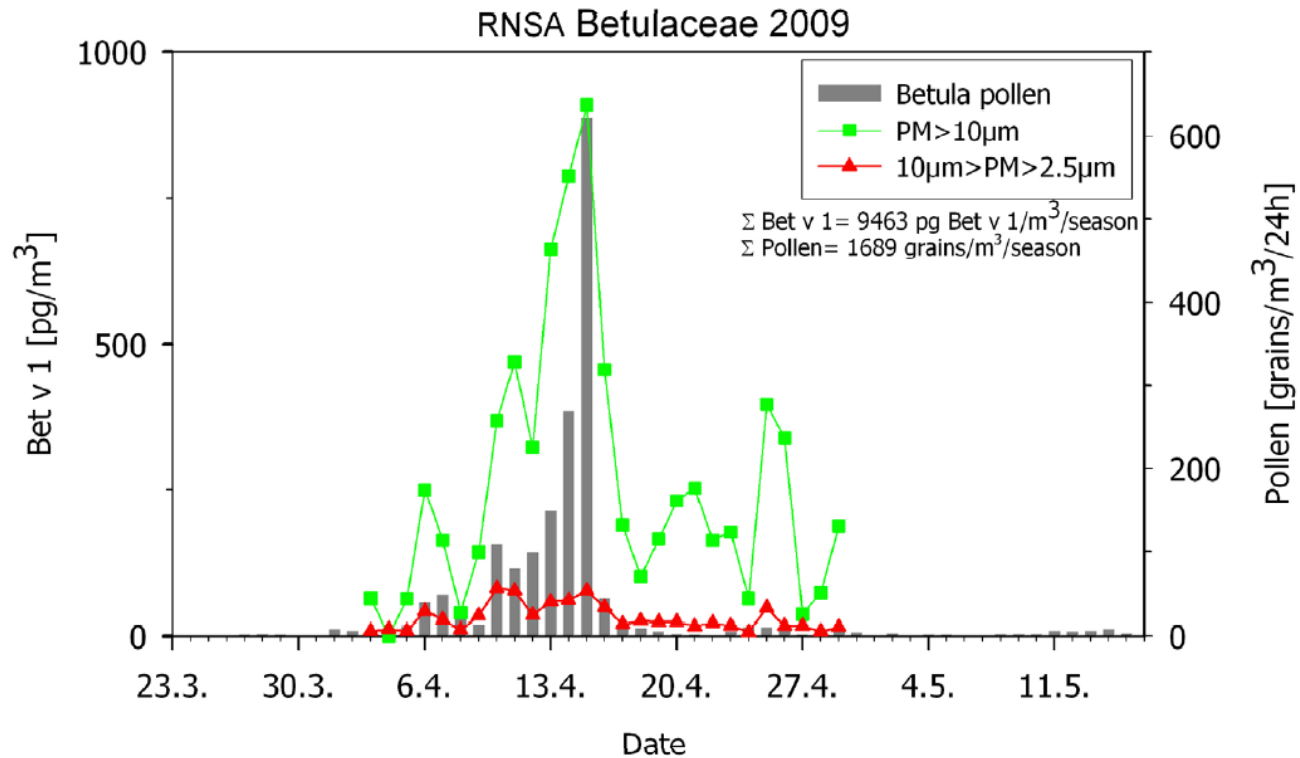
Bouleau / Bet v 1



France - 2009 : Bouleau / Bet v 1



RNSA (France): Birch pollen and allergen Bet v 1 in ambient air in 2009



Europe - 2009 : Bouleau / Bet v1

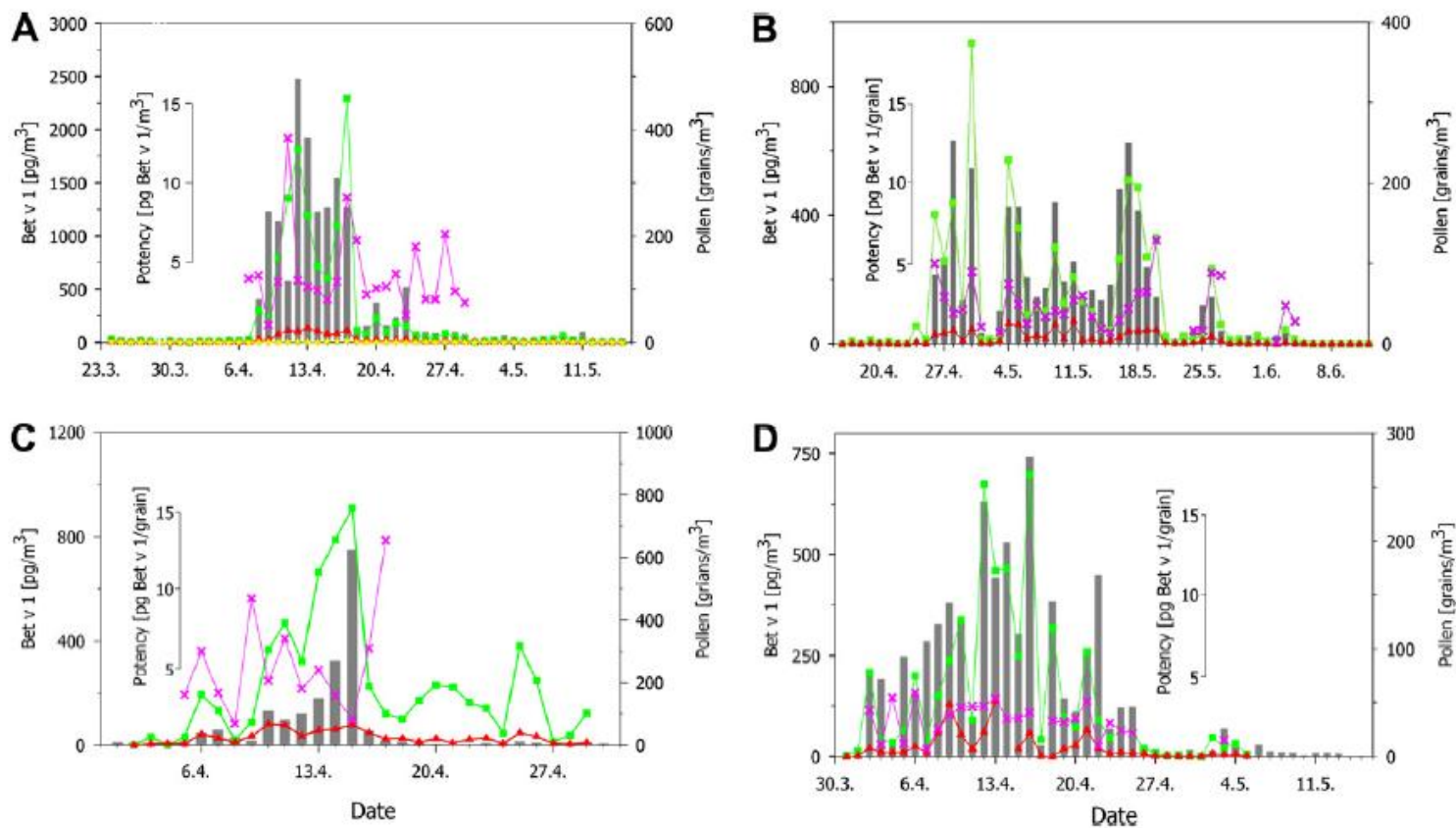
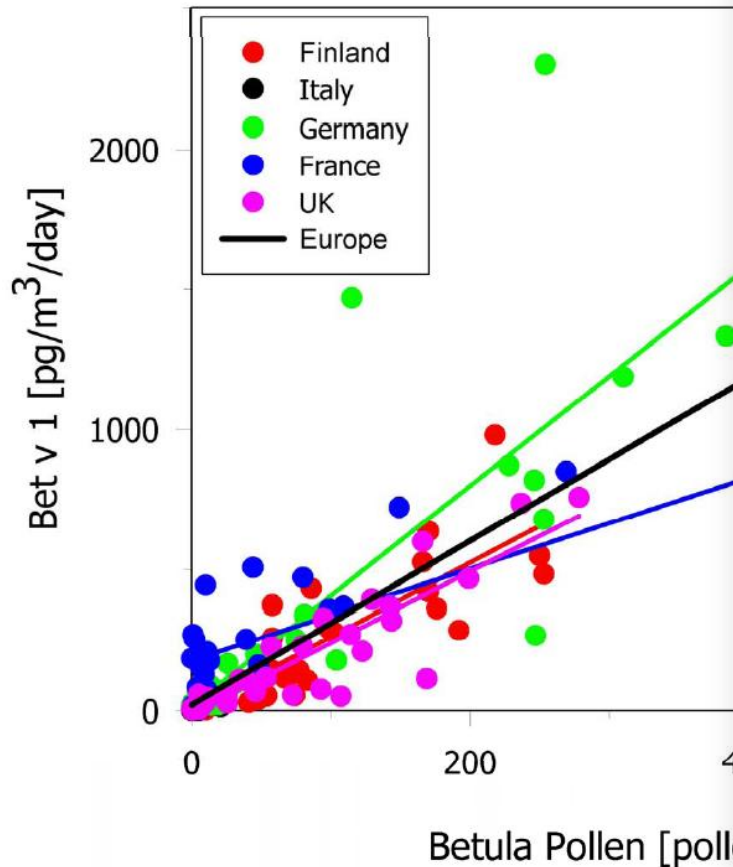


Fig. 1. Daily values in 2009 for birch pollen (gray bars) and Bet v 1 (colored lines) in PM > 10 μm (green) and 10 μm > PM > 2.5 μm (red) from the different European stations. (A) Munich, Germany (B) Turku, Finland (C) Lyon, France (D) Worcester, UK. Only Munich, Germany additionally sampled 2.5 μm > PM > 0.12 μm (yellow). Note: the scales differ between stations for clarity. The amount of daily allergen released per pollen is given for pollen counts >10 pollen m⁻³ (pink). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Europe - 2009 : Bouleau / Bet v1

Europe: correlation between birch p



Release of Bet v 1 from birch pollen from 5 European countries. Results from the HIALINE study

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- Human
- Bioprobe
- Europe

ABSTRACT

Exposure to allergens is pivotal in determining sensitization and allergic symptoms in individuals. Pollen grain counts in ambient air have traditionally been assessed to estimate airborne allergen exposure. However, the exact allergen content of ambient air is unknown. We therefore measured atmospheric concentrations of birch pollen grains and the matched major birch pollen allergen Bet v 1 simultaneously across Europe within the EU-funded project HIALINE (Health Impacts of Airborne Allergen Information Network).

Pollen count was assessed with first type pollen traps at 101 sites in France, United Kingdom, Germany, Italy and Finland. Allergen concentrations in ambient air were sampled at 801 sites in France, Germany, Italy and Finland. Allergen concentrations in ambient air were sampled at 801 sites with a Chemvol high-volume cascade impactor equipped with stages PM₁₀ > 10 µm, 10 µm > PM_{2.5} > 2.5 µm, and in Germany also 2.5 µm > PM₁₀ > 0.12 µm. The major birch pollen allergen Bet v 1 was determined with an allergen specific ELISA. Bet v 1 isoform patterns were analyzed by 2D-SDS-PAGE. Mass and mass spectrometric identification. Bioprobe activation was tested in an FcγR1-humanized rat bioprobe cell line passively sensitized with serum of a birch pollen symptomatic patient.

Compared to 10 previous years, 2009 was a representative birch pollen season for all stations. About 90% of the allergen was found in the PM₁₀ > 10 µm fraction at all stations. Bet v 1 isoforms pattern did not vary substantially neither during dispersing of pollen nor between different geographical locations. The average European allergen release from birch pollen was 3.2 pg Bet v 1/pollen and did not vary much between the European countries. However, in all countries a >10-fold difference in daily allergen release per pollen was measured which could be explained by long-range transport of pollen with a deviating

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Europe - 2009 : Bouleau / Bet v1

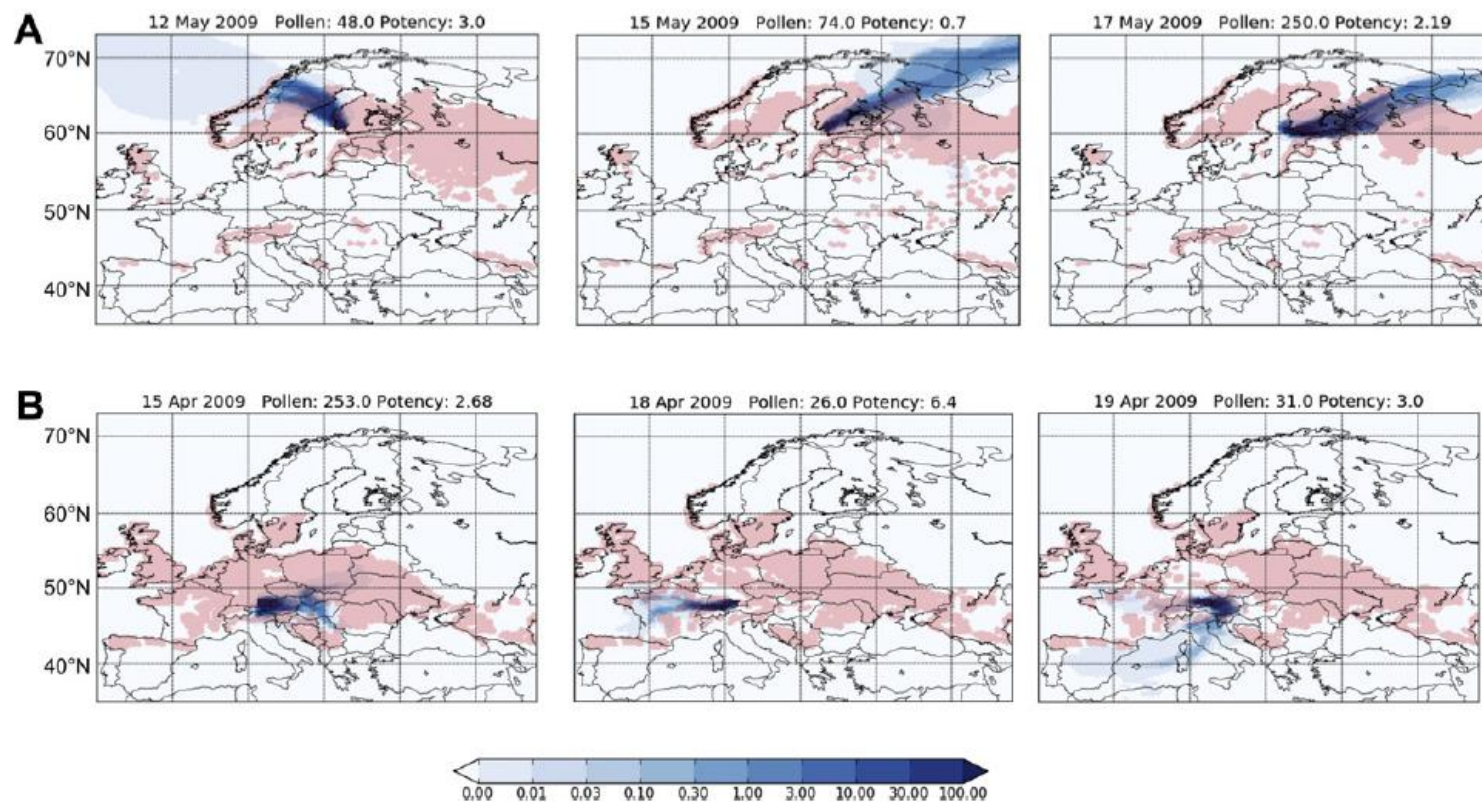
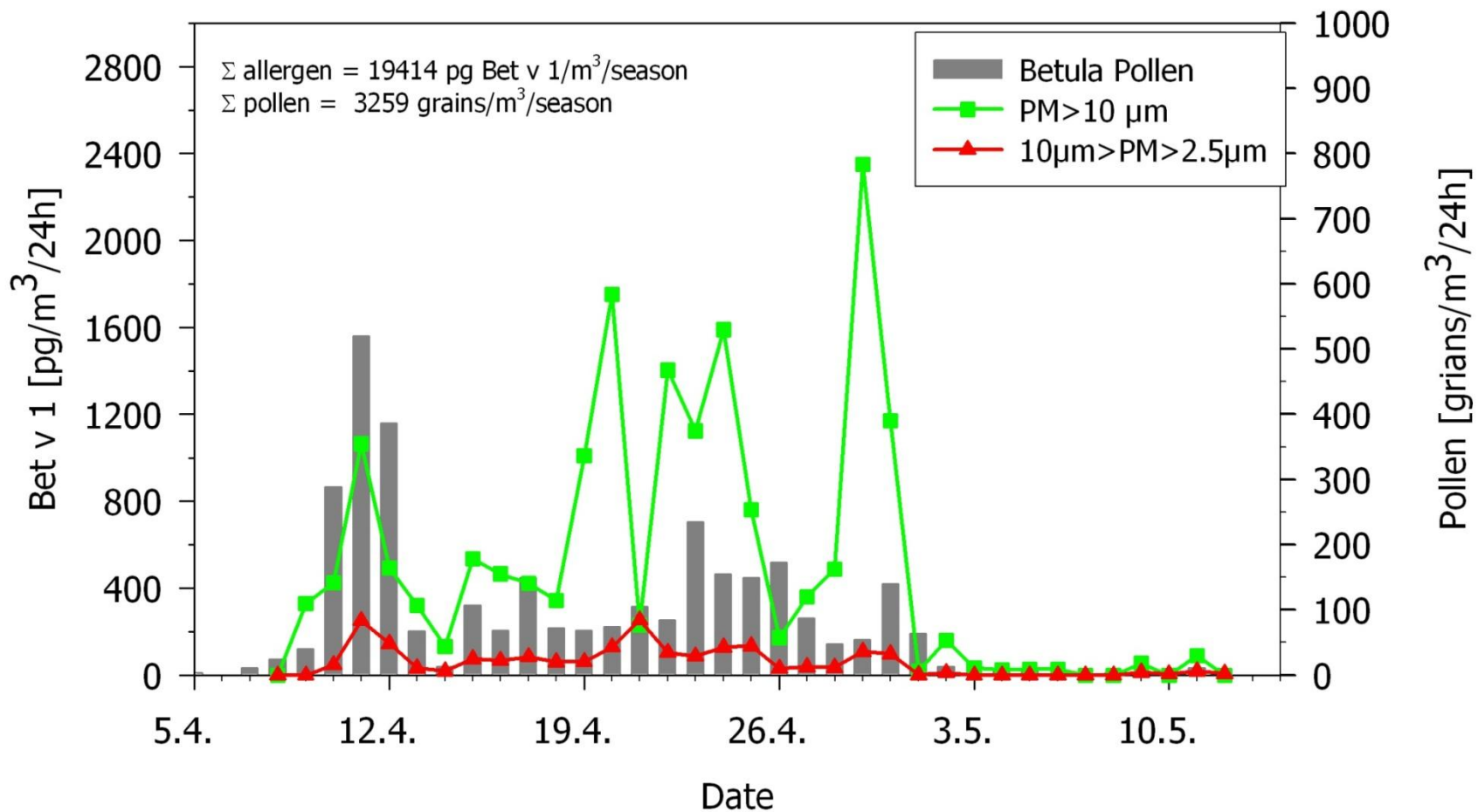


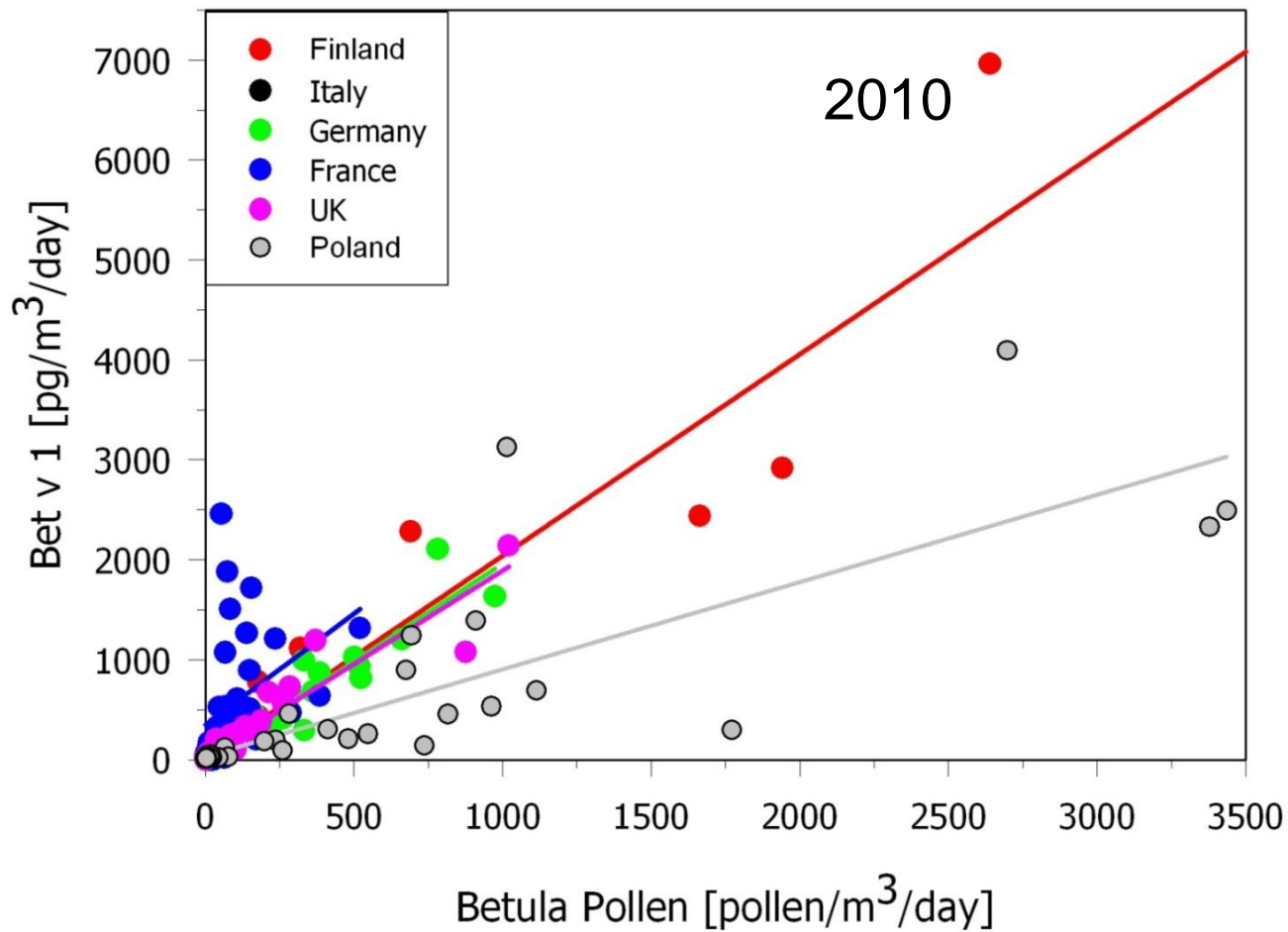
Fig. 6. Flowering of birch trees (pink) and the observation footprint (area where the particles collected in the instrument stem from considering the last 60 hr, blue). Date, pollen concentration and their potency ($\mu\text{g Bet v 1}/\text{pollen}$) is given. The potency of pollen can depend on the area of origin. (A) Turku, Finland and (B) Munich, Germany. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

France - 2010 : Bouleau / Bet v 1

RNSA Betula 2010

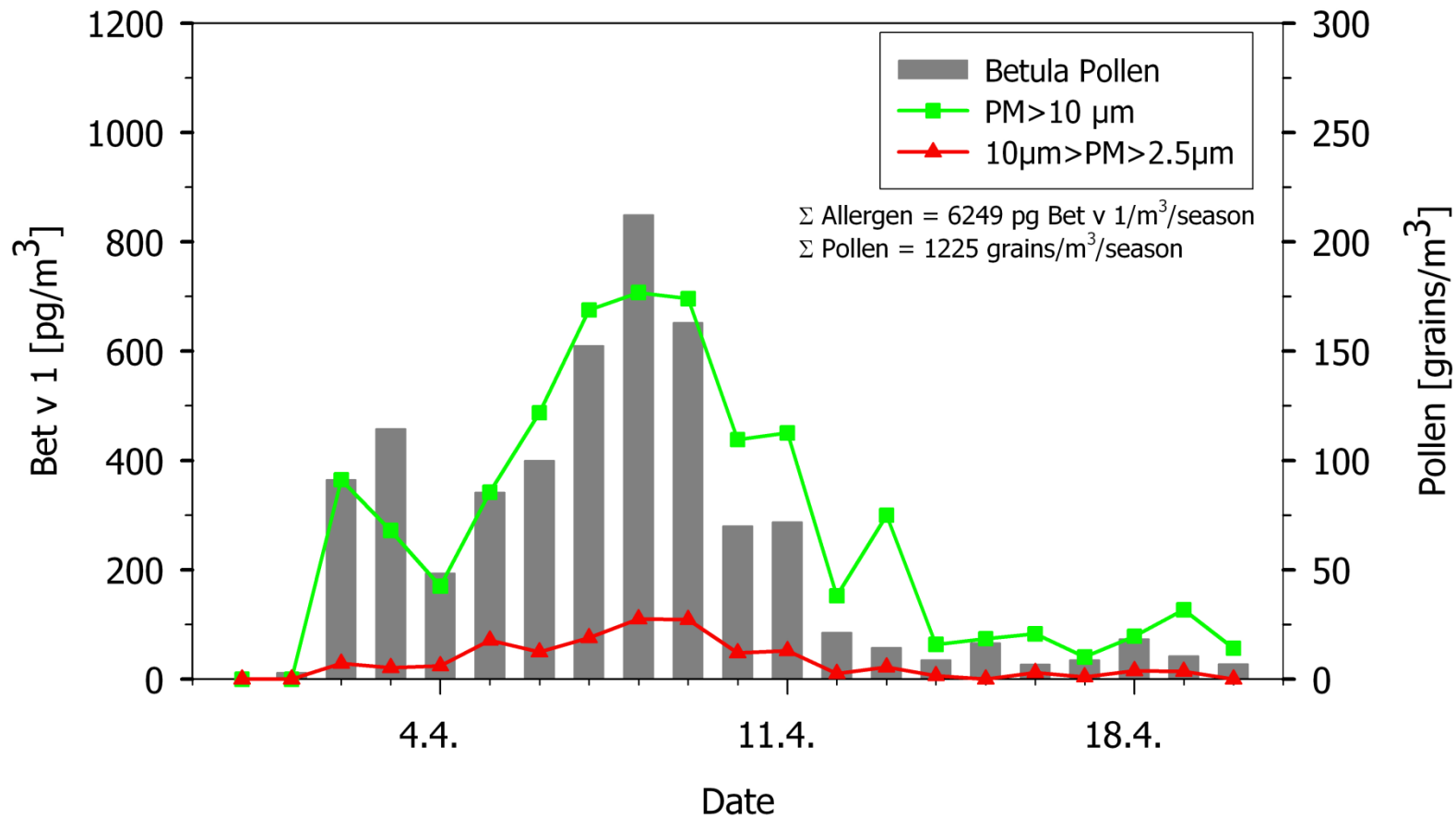


Europe - 2010 : Bouleau / Bet v1

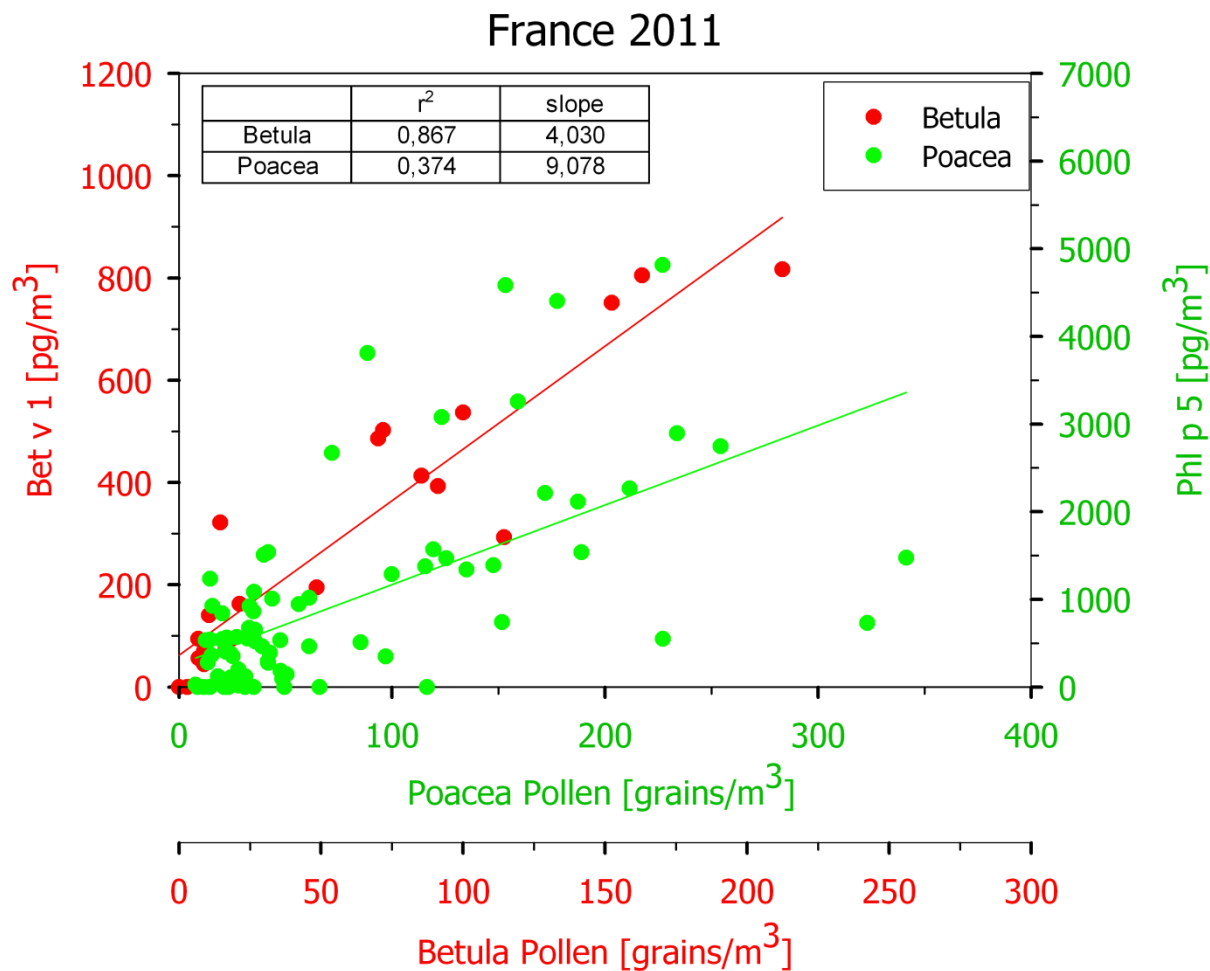


France - 2011 : Bouleau / Bet v 1

France Betula 2011



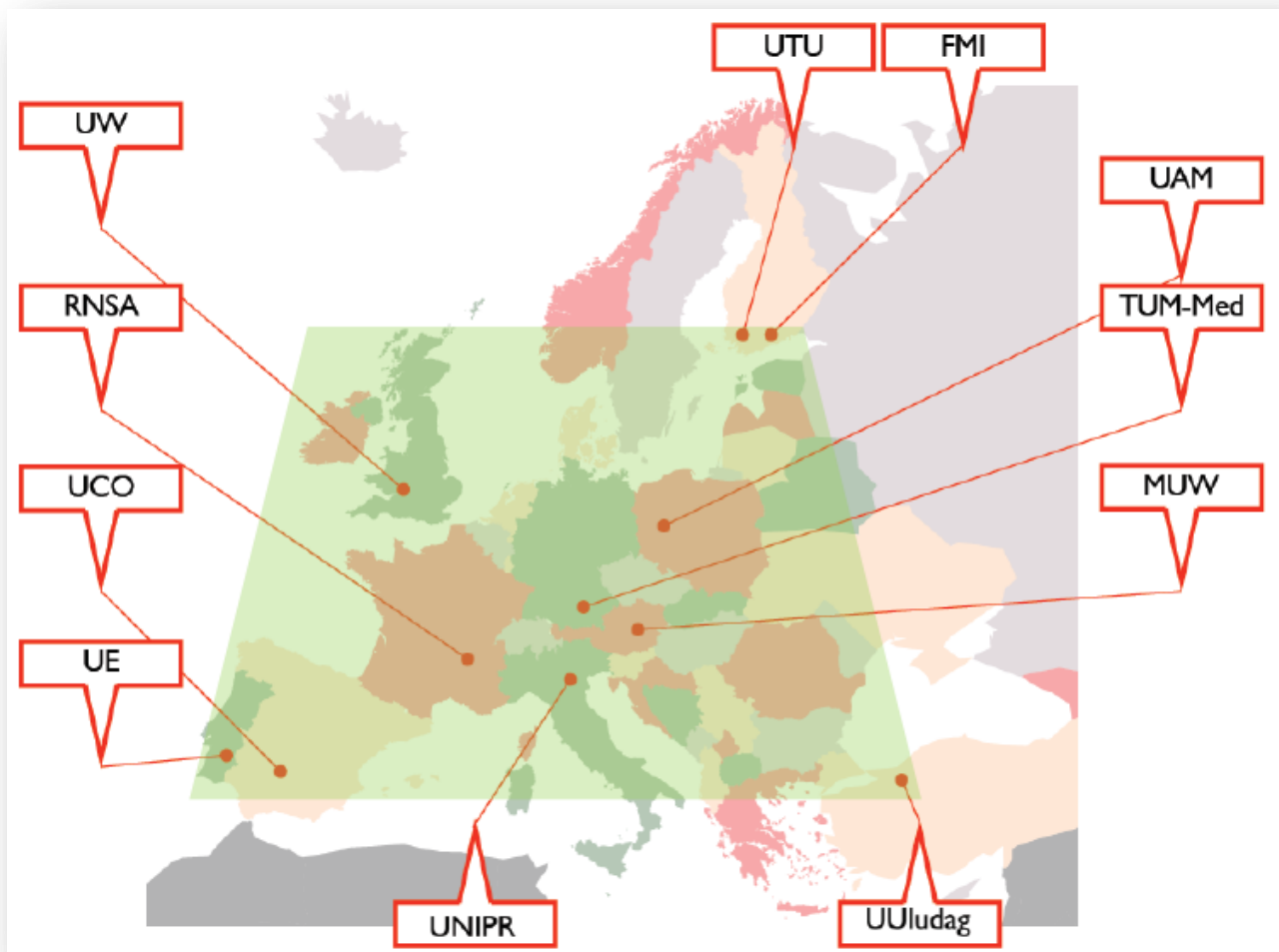
France - 2011 : bouleau / Bet v 1



Bilan bouleau / bet v1

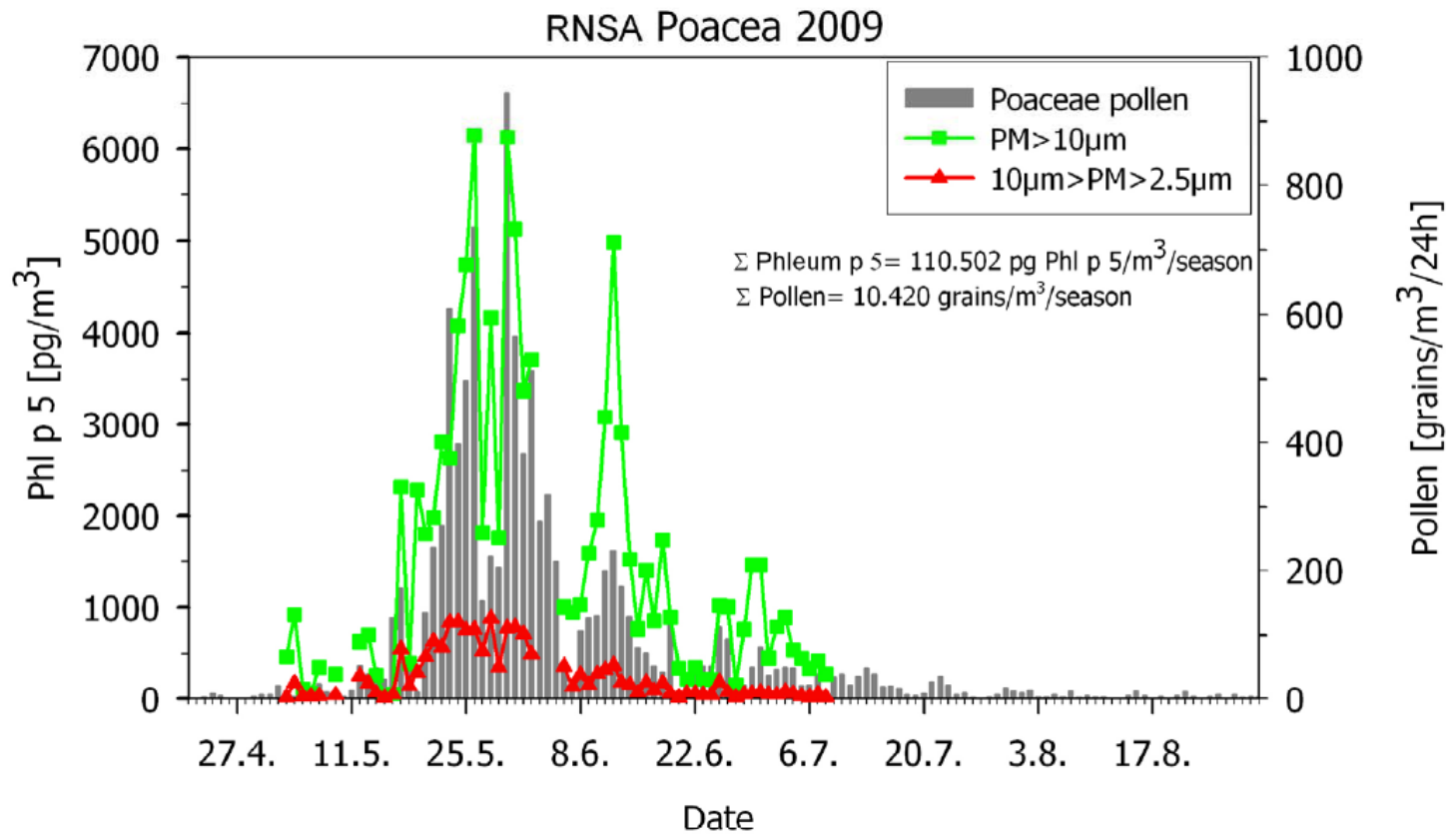
	2009		2010		2011	
	Pollens (grains/m ³)	Allergènes (pg/pollen)	Pollens (grains/m ³)	Allergènes (pg/pollen)	Pollens (grains/m ³)	Allergènes (pg/pollen)
Turku	2923	2,62	14806	2,02		
TUM	3144	3,95	7250	1,95	6158	2,47
UNIPR	100	2,57	497	3,33	423	3,99
WOC	2586	2,26	4628	1,87	3103	
RNSA	1689	3,06	3259	2,23	1225	4,03
MUW			6987	2,38		
UAM	11614		21107	2,59	21158	1,71
Davos			1036	1,93	507	2,05
Moyenne	2088	2,89	8362	2,34	6413	3,05
s.d. %		22,7		21,5		37,8

Graminées / Phl p 5



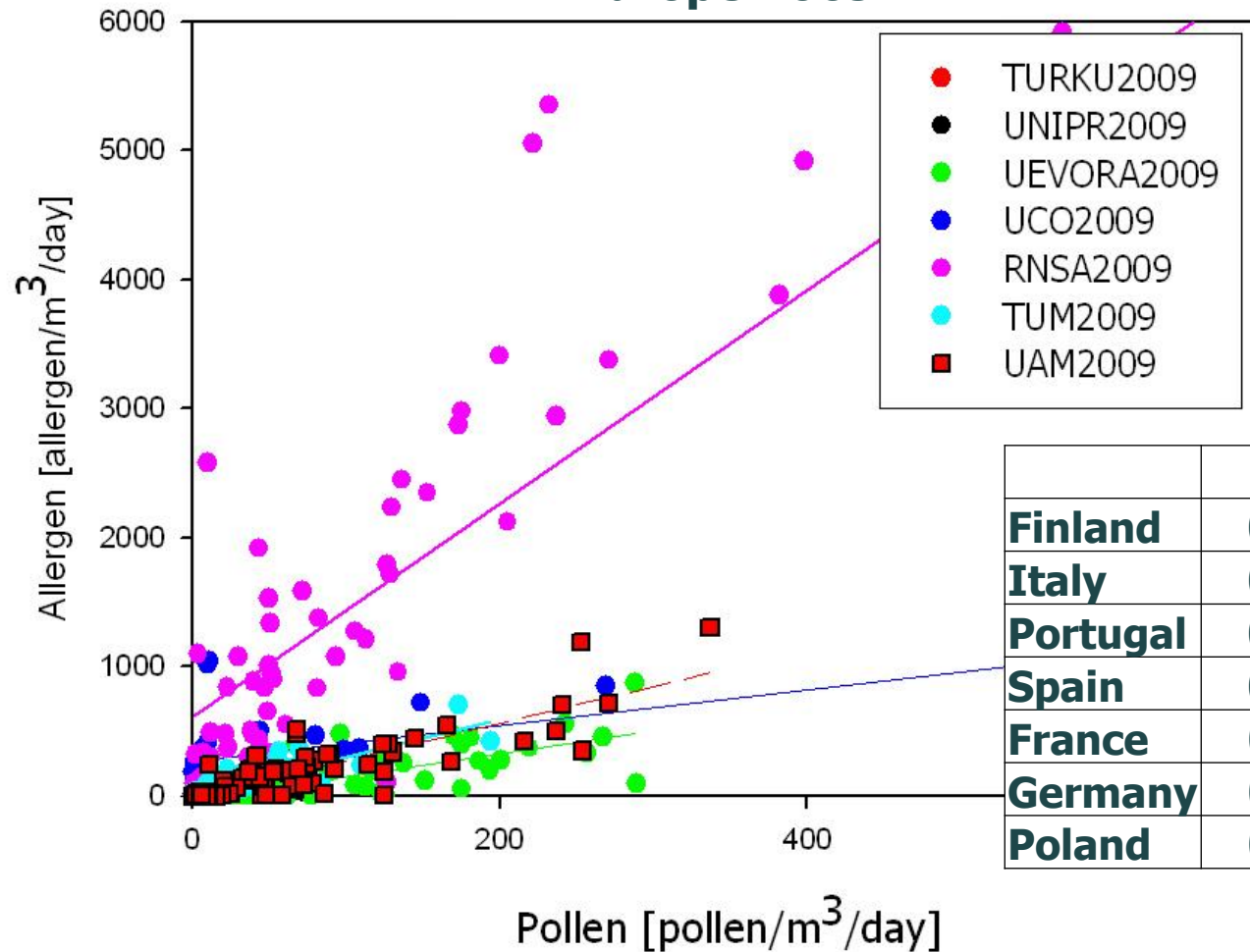
France - 2009 : Graminées / Phl p 5

RNSA (France): Grass pollen and allergen Phl p 5 in ambient air in 2009



Europe - 2009 : Graminées / Phl p 5

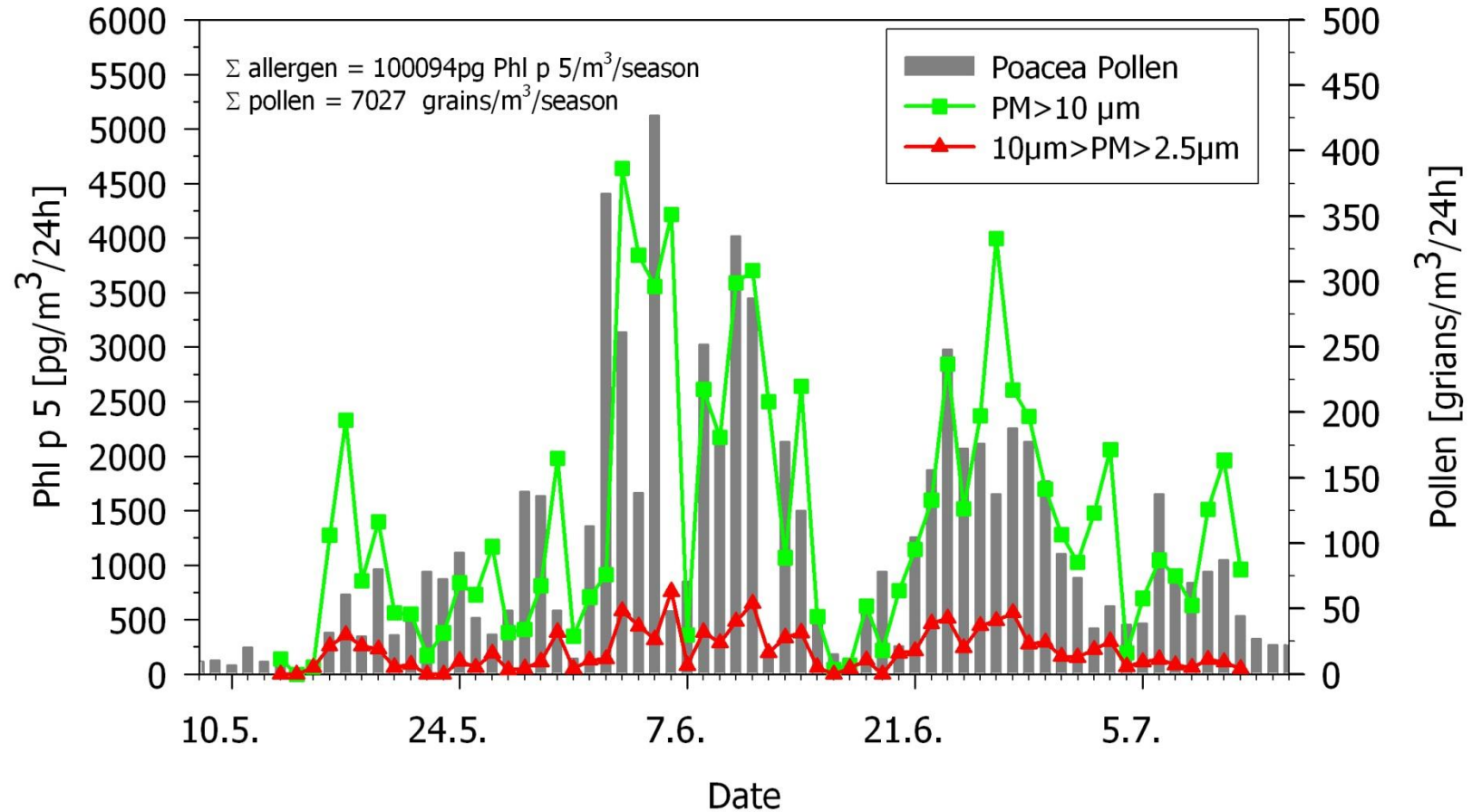
Europe 2009



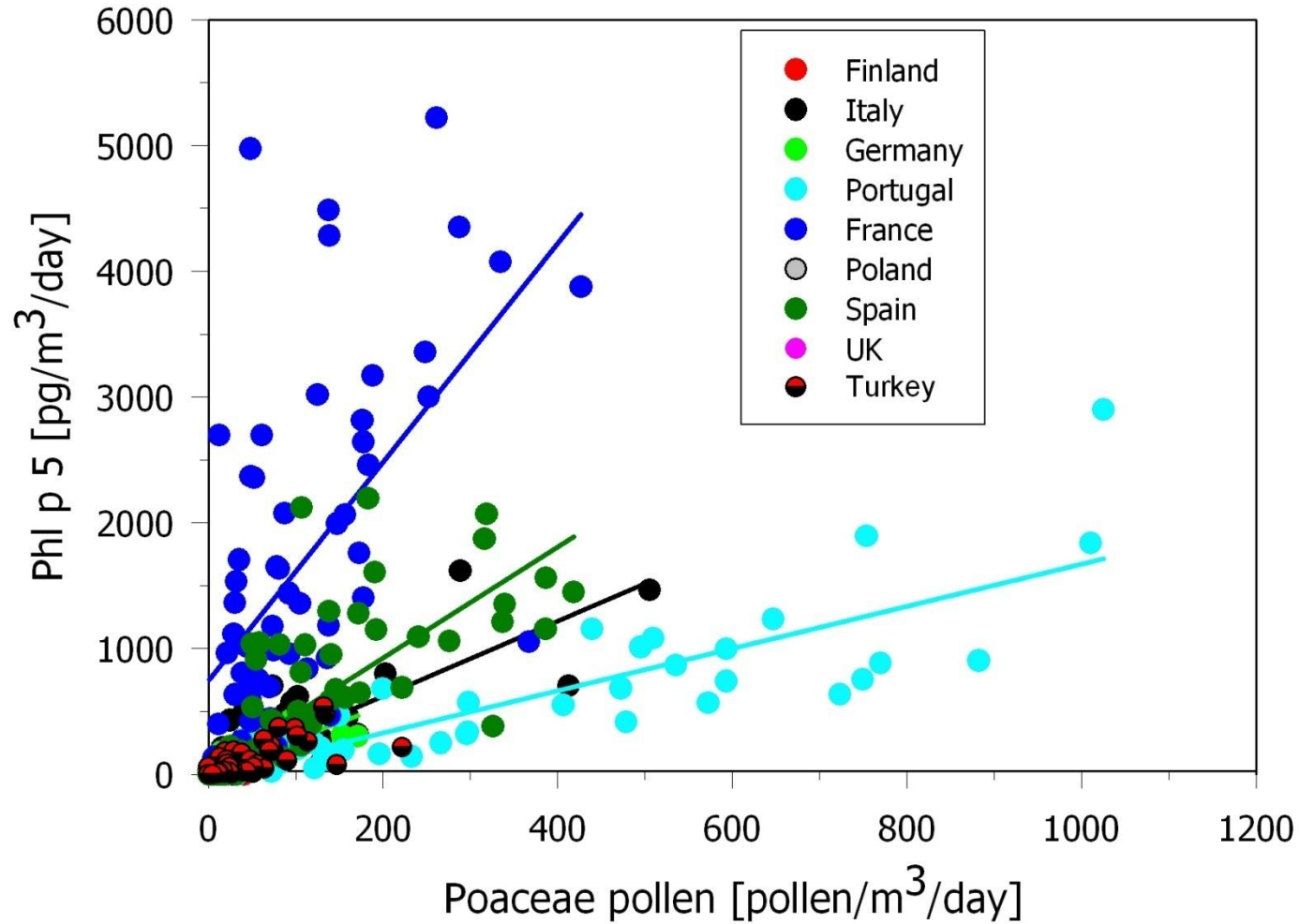
	r ²	slope
Finland	0.491	2.168
Italy	0.141	0.467
Portugal	0.608	1.780
Spain	0.320	1.386
France	0.785	8.264
Germany	0.755	2.954
Poland	0.751	2.866

France - 2010 : Graminées / Phl p 5

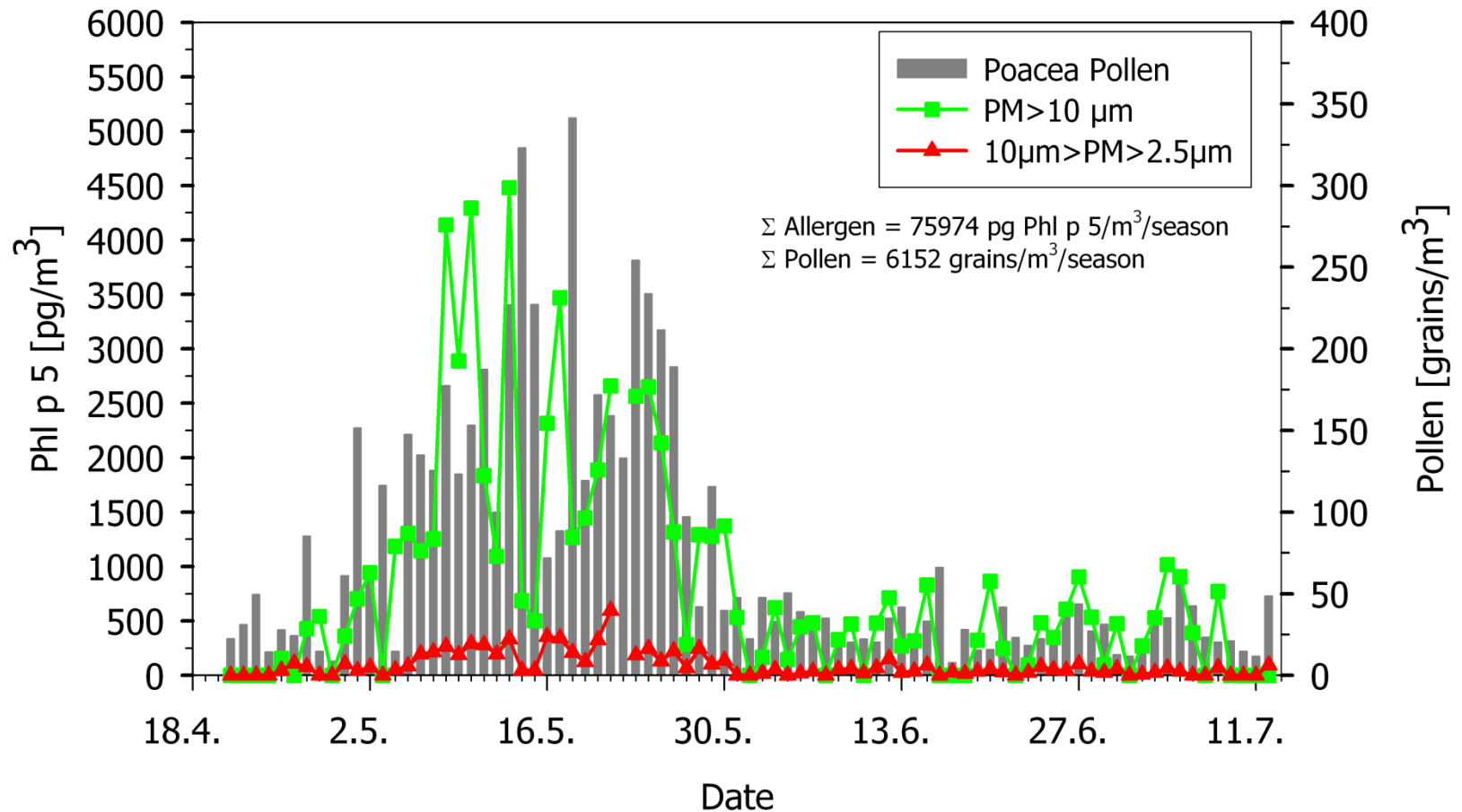
RNSA Poacea 2010



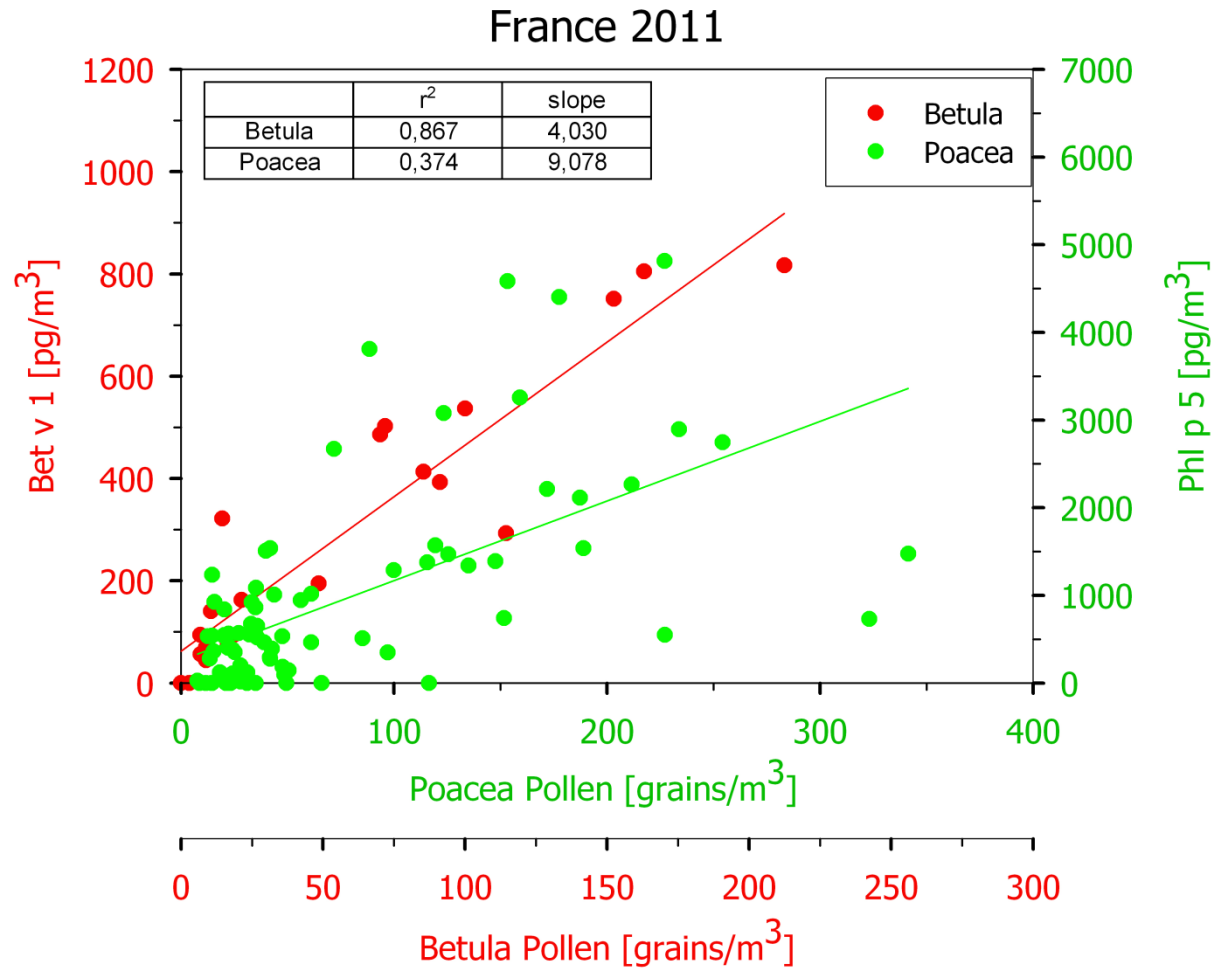
Europe - 2010 : Graminées / Phl p 5



France Poacea 2011



France - 2011 : Graminées / Phl p5



Bilan Graminées / Phl p 5

	2009		2010		2011	
	Pollens (grains/m ³)	Allergènes (pg/pollen)	Pollens (grains/m ³)	Allergènes (pg/pollen)	Pollens (grains/m ³)	Allergènes (pg/pollen)
Turku	654	2,17	738	1,76		
TUM	1999	3,06	1821	2,58	2184	2,24
UNIPR	4165	0,98	4362	2,98		
WOC	4882	6,20	4996	3,52	3531	
RNSA	10420	8,21	7027	8,69	6152	9,08
MUW			2559	2,52		
UAM	6083	2,62	7898	2,93	7898	1,79
UEVORA	5643	1,95	17107	1,68	22536	0,38
UCO	3876	2,49	8166	4,41	6850	2,47
UU			2892	2,09		
Davos			1230	2,53	1878	1,66
Moyenne	4715	3,46	5345	3,32	8192	3,19
s.d. %		70,9		62,1		106,2

Conclusions

- **Différents profils pour les pollens et leur contenu en allergène ont été observés**
- **Des quantités similaires de pollens à différents endroits géographiques produisent différentes quantités d'allergènes**
- **De plus, dans une même région, les quantités d'allergènes pour un pollen peuvent varier d'une année sur l'autre et également pendant une même saison**
- **Pollens différent en allergènes entre les différents pays**

Conclusions

