RAGWEED POLLEN COLLECTED ALONG HIGH TRAFFIC ROADS SHOWS A HIGHER ALLERGENICITY THAN POLLEN SAMPLED IN VEGETATED AREAS

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AIM OF THE WORK

Identify differences in the allerginicity of pollen from *Ambrosia artemisiifolia* L. plants grown in Lombardia areas, with different degrees of traffic-related pollution.

Why ragweed ?

Invasive non-native herbaceous plant

growing: at roadsides, cultivated fields, vacant lots, fence rows, construction sites and railway lines

Highly allergenic pollen

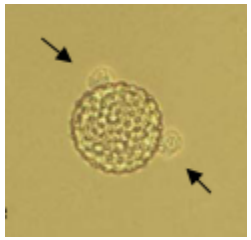
second cause of pollinosis in the Region

EXPERIMENTAL DESIGN

STEP 1 → **STEP 2** → **STEP 3** → **STEP 4**

Pollen collection

Analysis of SPP release



Microscope analysis

Analysis of total pollen allergenicity

Protein

slot blot

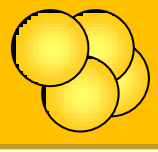
Analysis of pollen allergens

Mono/bidimensional elettrofophoresis
Western blot
Mass Spectrometry

Study area and pollen collection

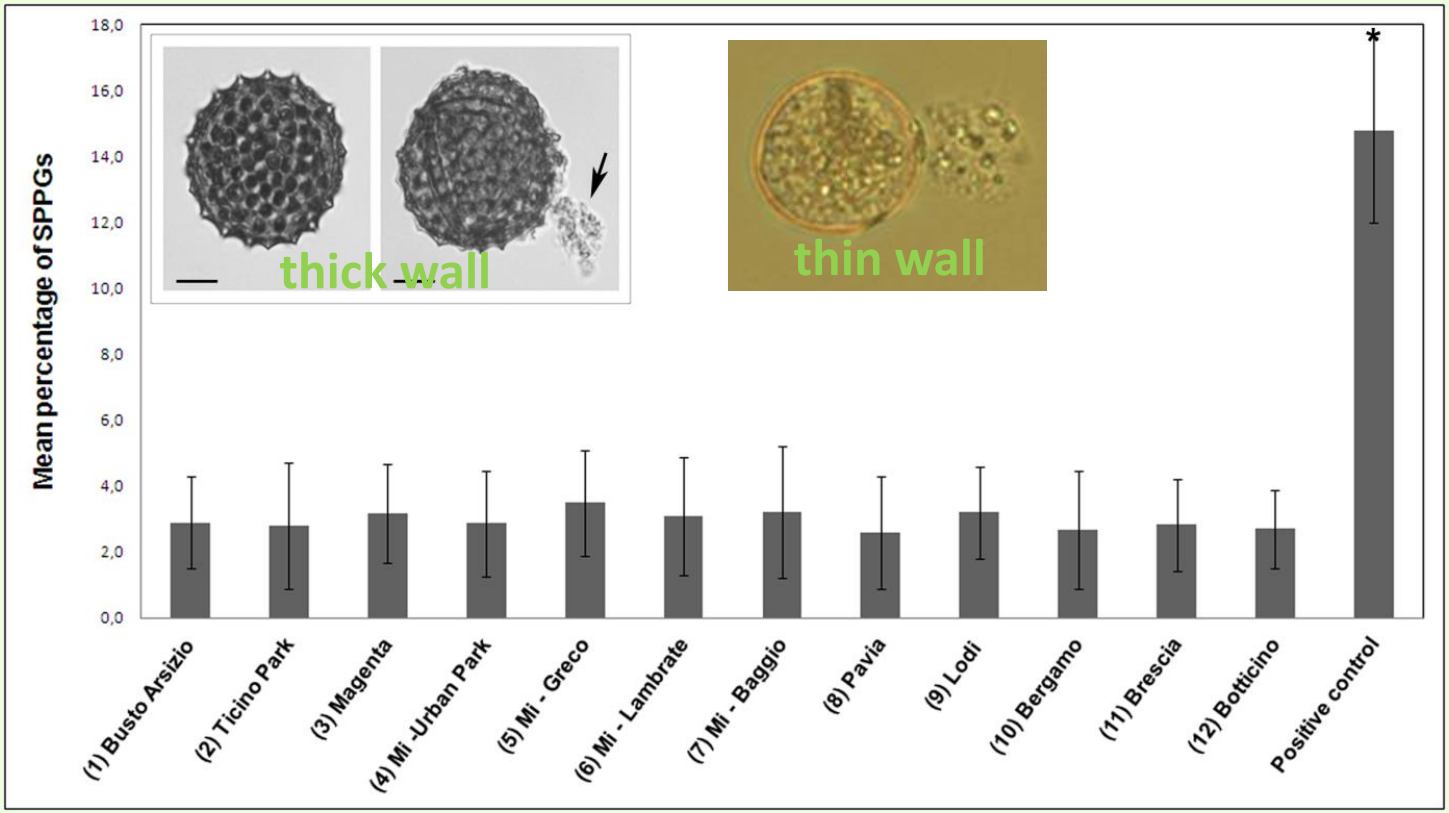
Categories	Mean number of vehicles /day
Vegetated area	0
Low traffic roads	< 8000 and > 2000
High traffic roads	> 15000

- pollen collection from many plants
- pollen collection was carried out around noon
- at least 5 mature pollen samples per site (during pollen sesason)



laboratory

Analysis of sub pollen particles release



SPPG= subpollen particle releasing grains

Positive control: annual bluegrass (*Poa annua*) exposed to soil contaminated with Cd

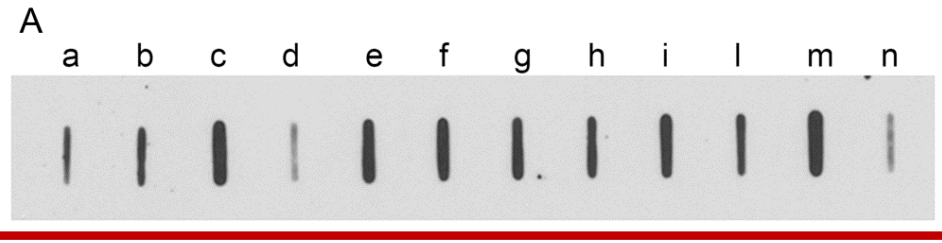
no statistical difference was detected in the percentage of SPPGs among pollen samples.

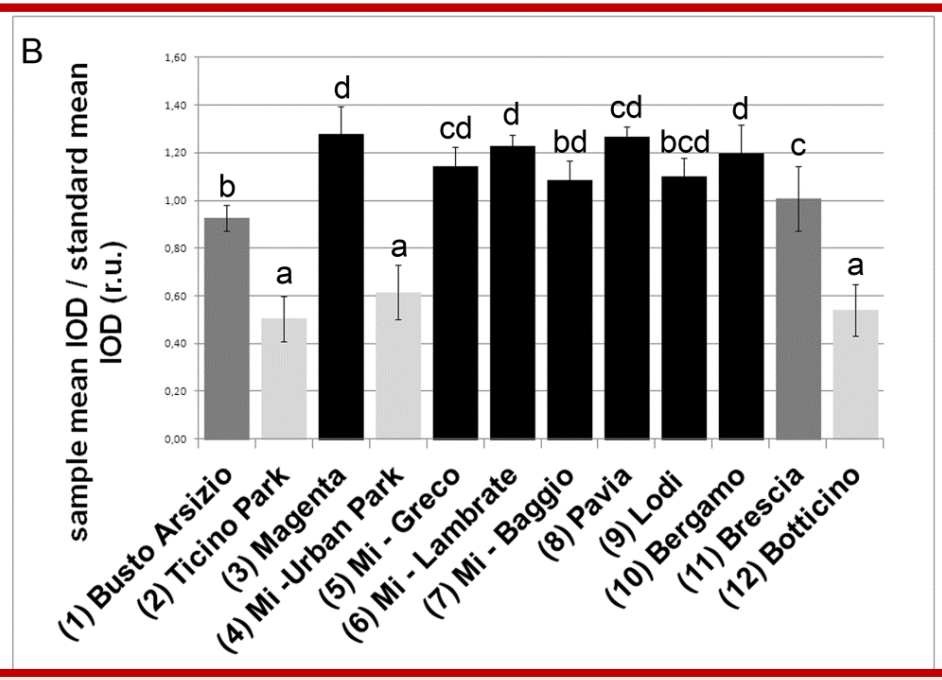
Assessment of pollen allergenicity: slot blot analysis

IgE reaction

Pollen extract
(allergen proteins in native conditions)

Pooled sera
from patients allergic to ragweed





reactivity of samples from different sites

(a) Standard (Allergon); (b) Busto Arsizio; (c) Magenta; (d) Ticino; (e) Mi-Lambrate; (f) Mi-Baggio; (g) Pavia; (h) Bergamo (i) Lodi; (l) Brescia; (m) Mi-Greco; (n) Mi-Urban Park.

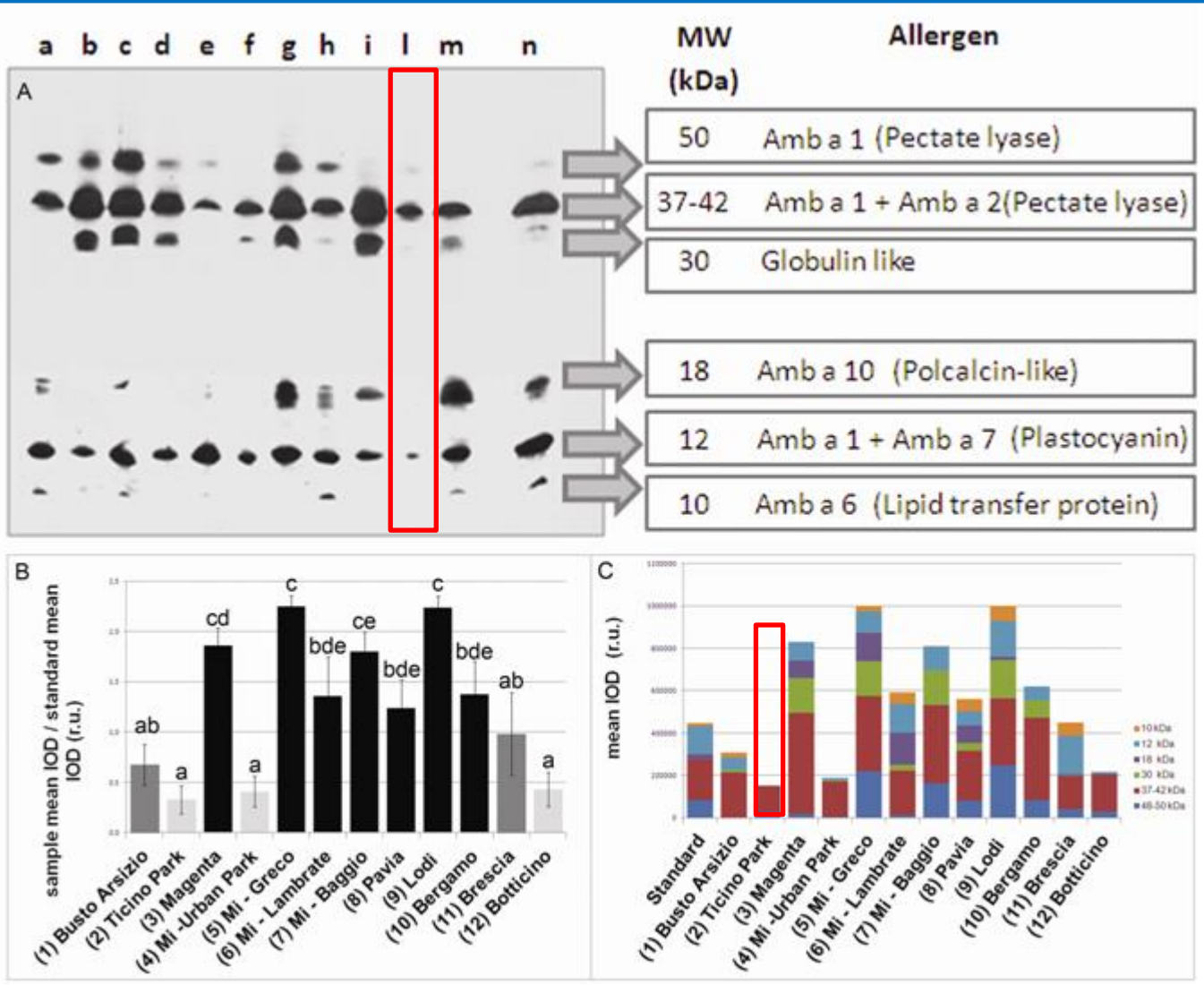
Categories
Vegetated area
Low traffic roads
High traffic roads

High traffic road samples

more allergenic than samples from vegetated areas

Different letters indicate significant differences among the samples (ANOVA and Duncan test, $P \leq 0.05$).

Assessment of pollen allergenicity: allergen analysis

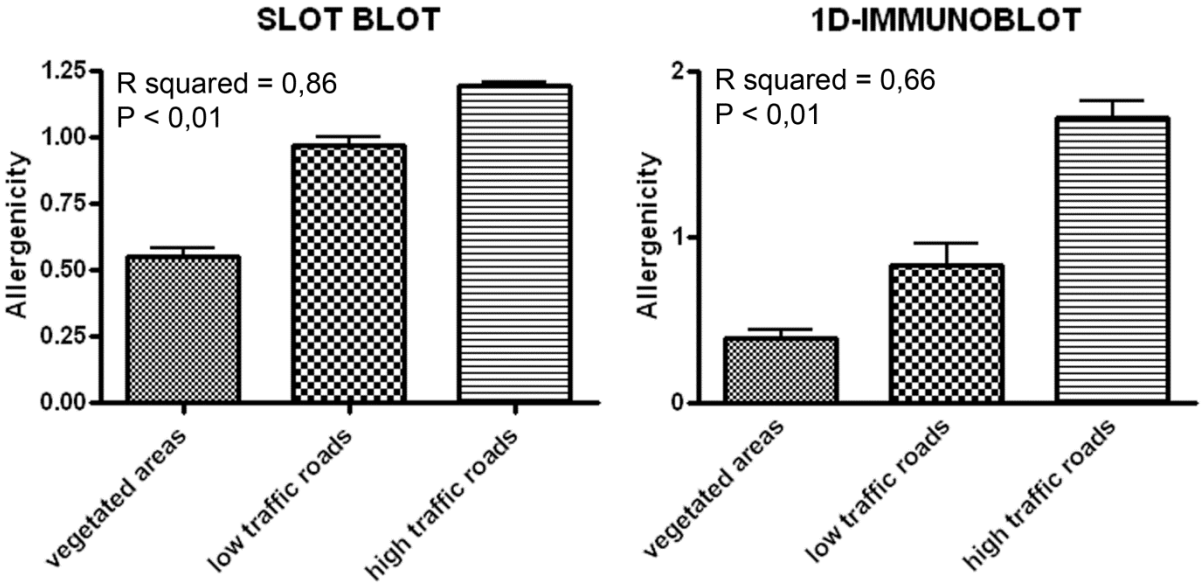


Higher allergenicity can be ascribed to:

- a higher Amb a 1 reactivity
- additional allergenic proteins

Conclusion

Our findings show that:



Other factors?

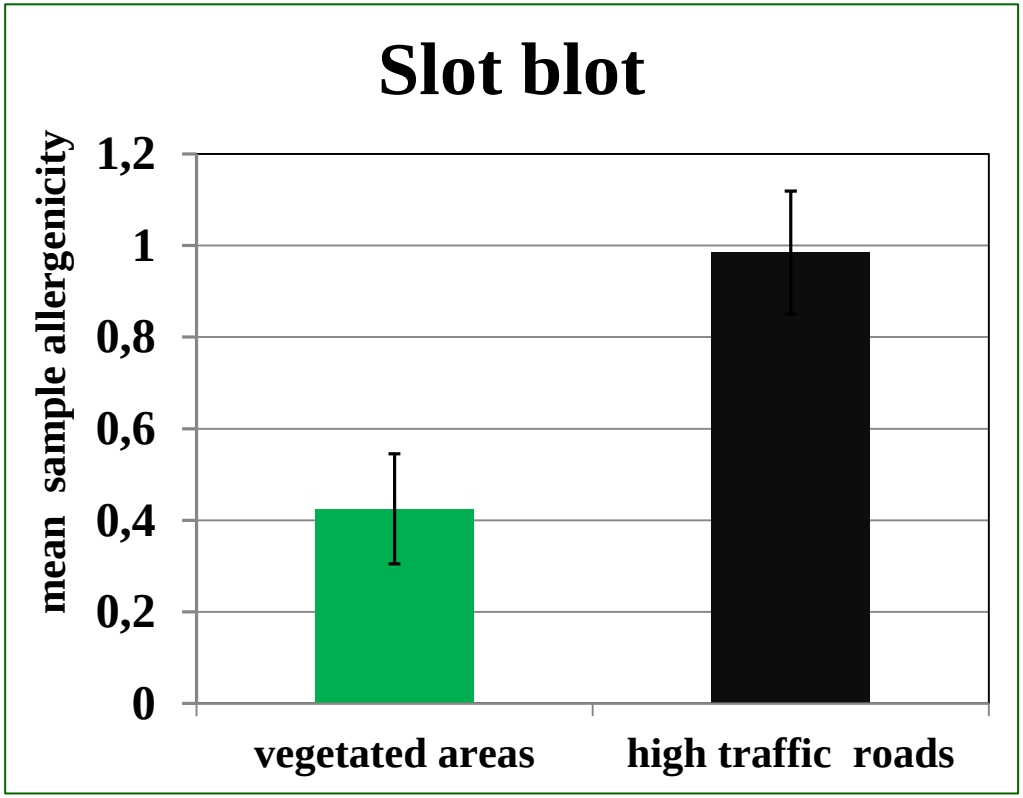
Climate variables no correlation with allergenicity

allergenicity is correlated to the site type

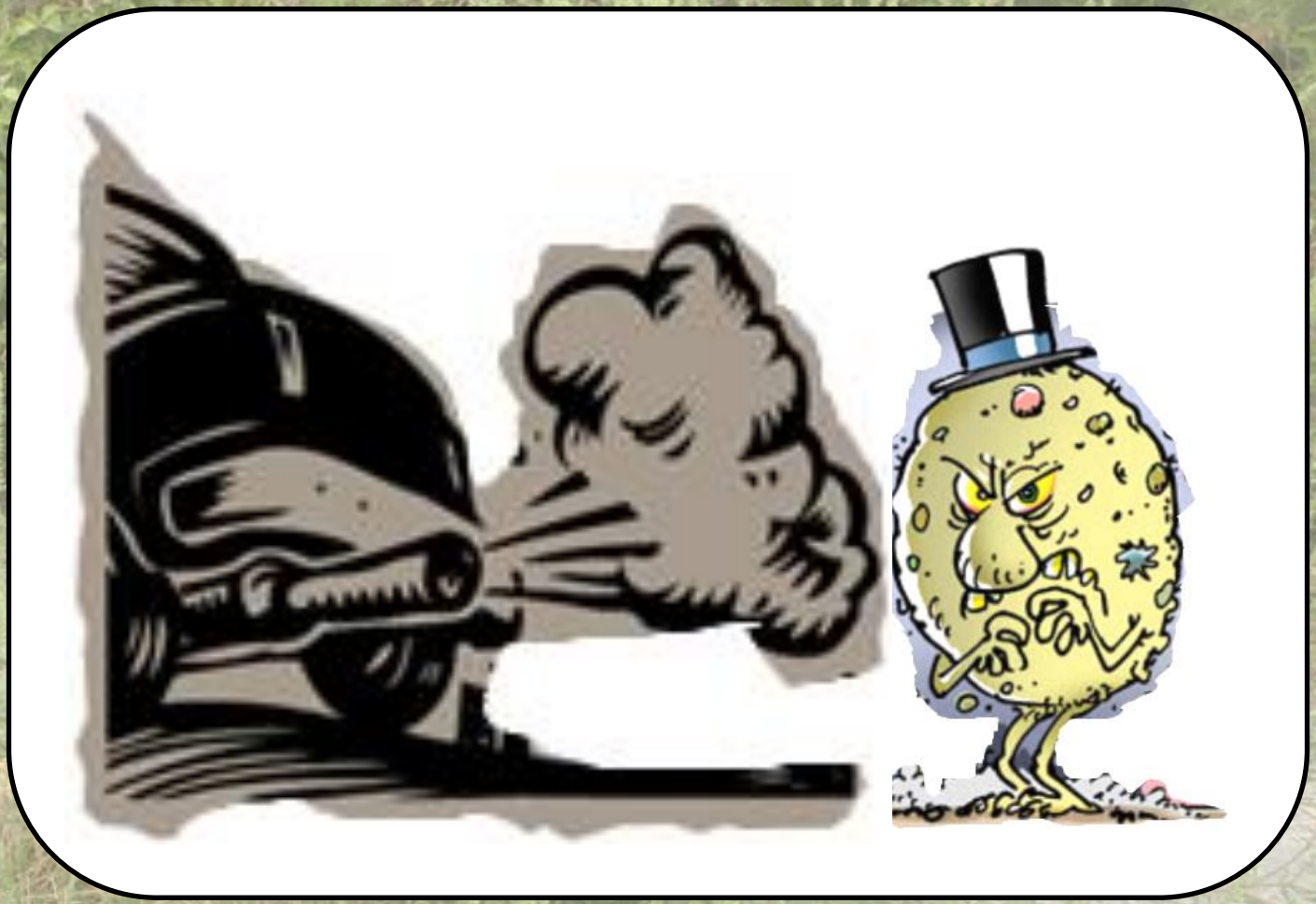
Does traffic-related pollution enhance ragweed pollen allergenicity?

Likely YES

Allergenicity of pollen samples collected during 2011 season



Allergenicity of pollen from plants grown along traffic roads was statistically higher ($P<0,05$)

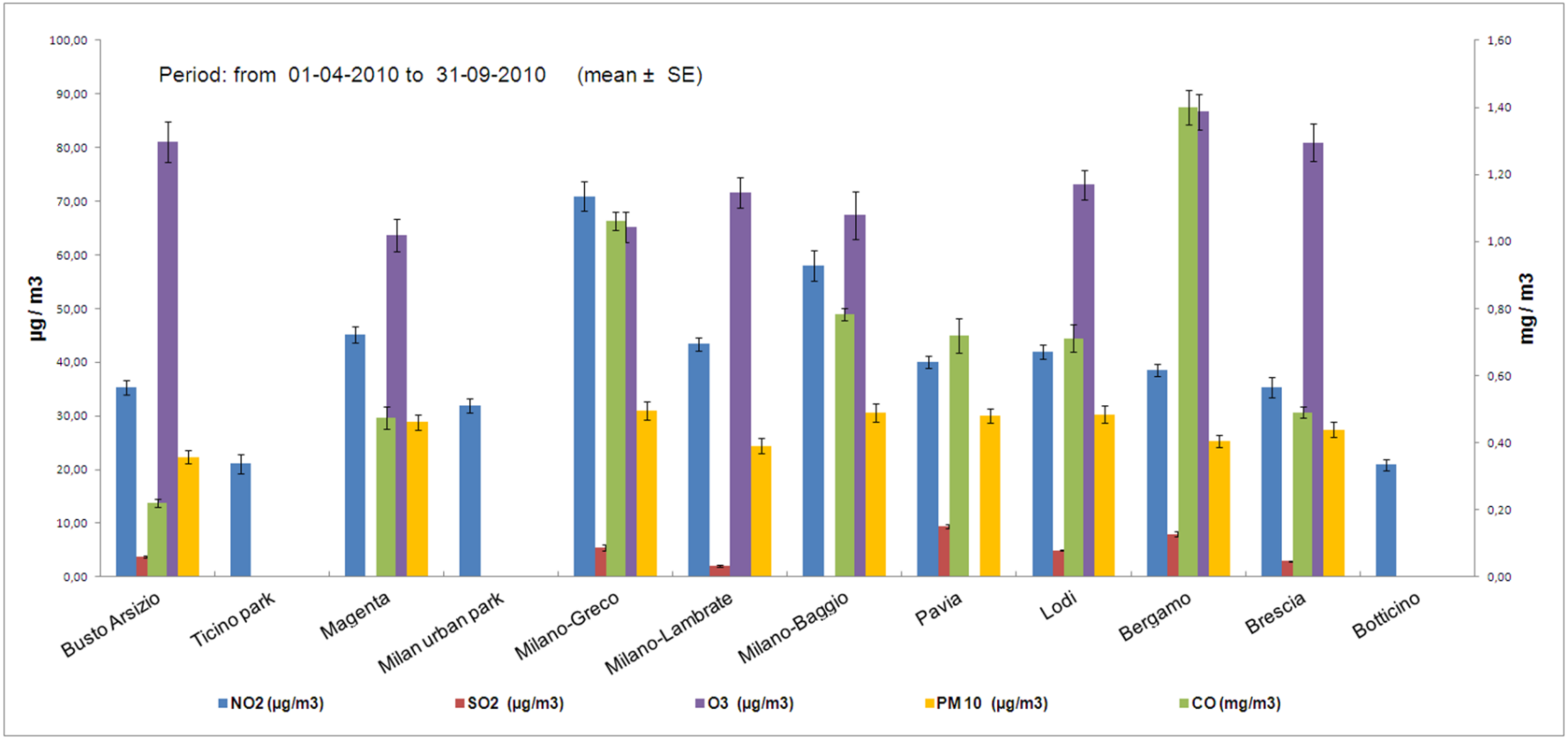


Thank you

Climatic variables in the sampling sites during 2010 pollen sampling season

Site	Type of site	Temperature (C°)			Relative humidity (%)
		mean T	mean Tmin	mean Tmax	
1	along low traffic road (Busto Arsizio)	22,2 ± 3,0	17.7 ± 3.1	27.1 ± 3.4	68 ± 11
2	vegetated area (Ticino park)	23,0 ± 3,1	16.2 ± 3.8	26.2 ± 3.3	62 ± 13
3	along high traffic road (Magenta)	22.8 ± 2.9	17.1 ± 3.2	27.8 ± 3.3	66 ± 14
4	vegetated area (Milan urban park)	21.9 ± 3.0	16.4 ± 3.1	27.1 ± 3.4	67 ± 13
5	along high traffic road (Milano-Greco)	23.6 ± 3.2	19.6 ± 3.2	27.8 ± 3.4	57 ± 15
6	along high traffic road (Milano-Lambrate)	20.5 ± 3.2	15.3 ± 3.2	26.1 ± 3.5	66. ± 14
7	along high traffic road (Milano-Baggio)	22.8 ± 3.1	17.9 ± 3.2	27.8 ± 3.5	53 ± 14
8	along high traffic road (Pavia)	23.2 ± 2.9	17.3 ± 2.8	29.7 ± 3.6	72 ± 10
9	along high traffic road (Lodi)	22.2 ± 3.0	17.3 ± 2.9	27.1 ± 3.4	74 ± 11
10	along high traffic road (Bergamo)	22.4 ± 3.1	17.3 ± 3.1	27.7 ± 3.3	68 ± 12
11	along low traffic road (Brescia)	24.3 ± 3.3	19.1 ± 3.1	29.5 ± 3.6	60 ± 12
12	vegetated rural area (Botticino)	21.9 ± 3.0	17.7 ± 3.0	27.8 ± 3.3	63 ± 11

Which pollutants?



NO2 determination with passive samplers; **other pollutants**: data from air quality monitoring devices