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Impact of municipal mobilization on Ambrosia density and pollen concentration in urban settings of southern Québec

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Canada

Study Hypothesis:

Concerted mobilization of a municipality to implement ragweed control strategies could reduce ragweed plant density and airborne pollen concentration.

Salaberry-de-Valleyfield (SV**)**

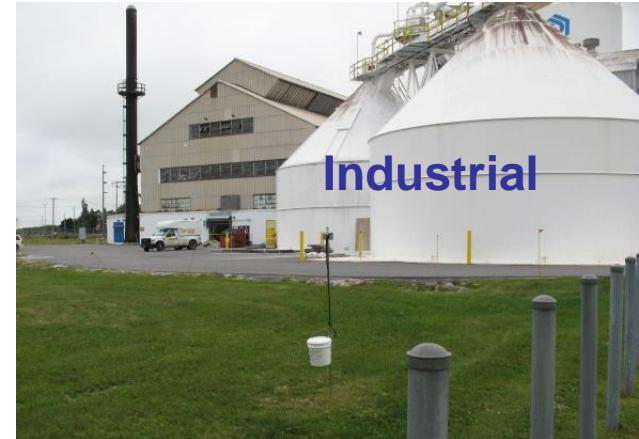
- Mobilized city
- Coordinated ragweed control program for all stakeholders
- **Saint-Jean-sur-Richelieu (**SJR**)**
 - Control city
 - Normal maintenance operation
- **Inventory 2007 : before municipal mobilization**
- **Inventory 2010 : after 3 years of mobilization**

Goals:

- Ragweed plants inventory
 - Document ragweed density in different urban habitats in two cities (mobilized vs control)
 - Stratified sampling
 - Prior to ragweed flowering period (July)
- Pollen inventory of ragweed
 - Document pollen concentrations in different urban habitats in two cities (mobilized vs control)
 - Stratified sampling
 - 12 consecutive days from mid August to end of August
- Statistical analysis on $\ln(\sqrt{x} + 1)$
- Figures = backtransformed values

Urban habitats within each city

- Residential
 - street, boulevard
- Landscaped
 - Park, bicycle trail, golf course, green space
- Industrial
 - Industrial land, gravel pit, manufacturing plant
- Disturbed
 - Snow deposit site, construction site, train track, hydro lines



Ragweed plants inventory – M & M

- Stratified sampling
 - City divided into 1.5 km² sectors
 - 13 sectors Salaberry-de-Valeyfield (**SV** - mobilized city)
 - 18 sectors Saint-Jean-sur-Richelieu (**SJR** - control city)
- Sampling intensity (~312-432 quadrats/city)
 - 3 sampling sites / habitat / sector
 - 2 habitats (minimum) sampled by sector
 - 2 quadrats (50 cm x 50 cm) / sampling site
 - 1 random quadrat at sampling site (random)
 - 1 quadrat selected with ragweed & located within 3 m of random quadrats (selective)

ANOVA– mixed model

ragweed density estimated by selective sampling

Source	df	F- value	Pr > F	Significance
Year	1	1,16	0,28	NS
City	1	6,08	0,01	**
Year * City	1	2,87	0,09	NS
Habitat	3	38,12	< 0,0001	***
Year * Habitat	3	0,59	0,62	NS
City * Habitat	3	4,60	0,003	**
Year * City * Habitat	3	4,49	0,004	**

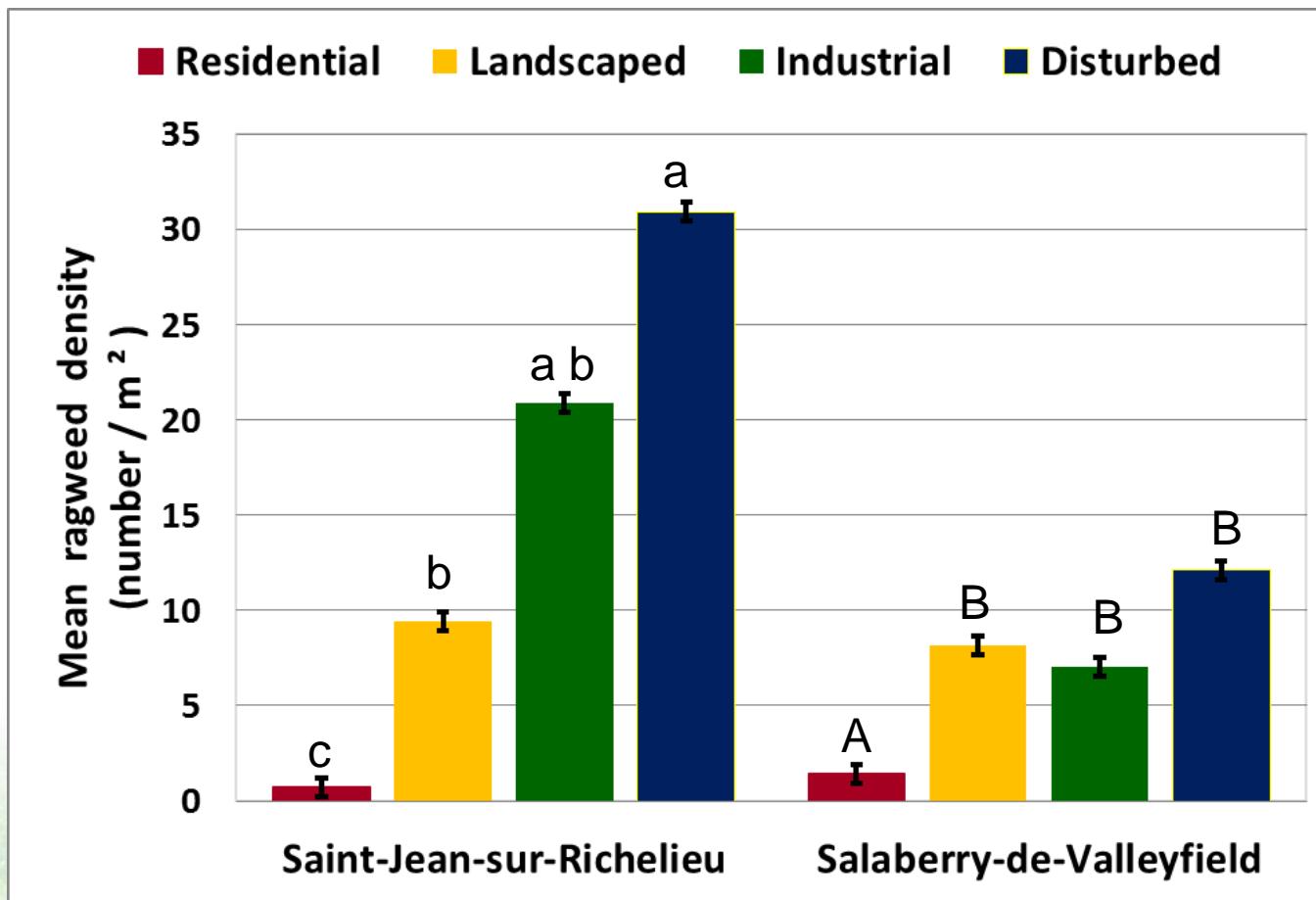
** $P < 0,01$

*** $P < 0,0001$



Mean ragweed density by habitats in both cities

~ Years confounded ~



Mean ragweed density by habitats in both cities 2007 vs 2010

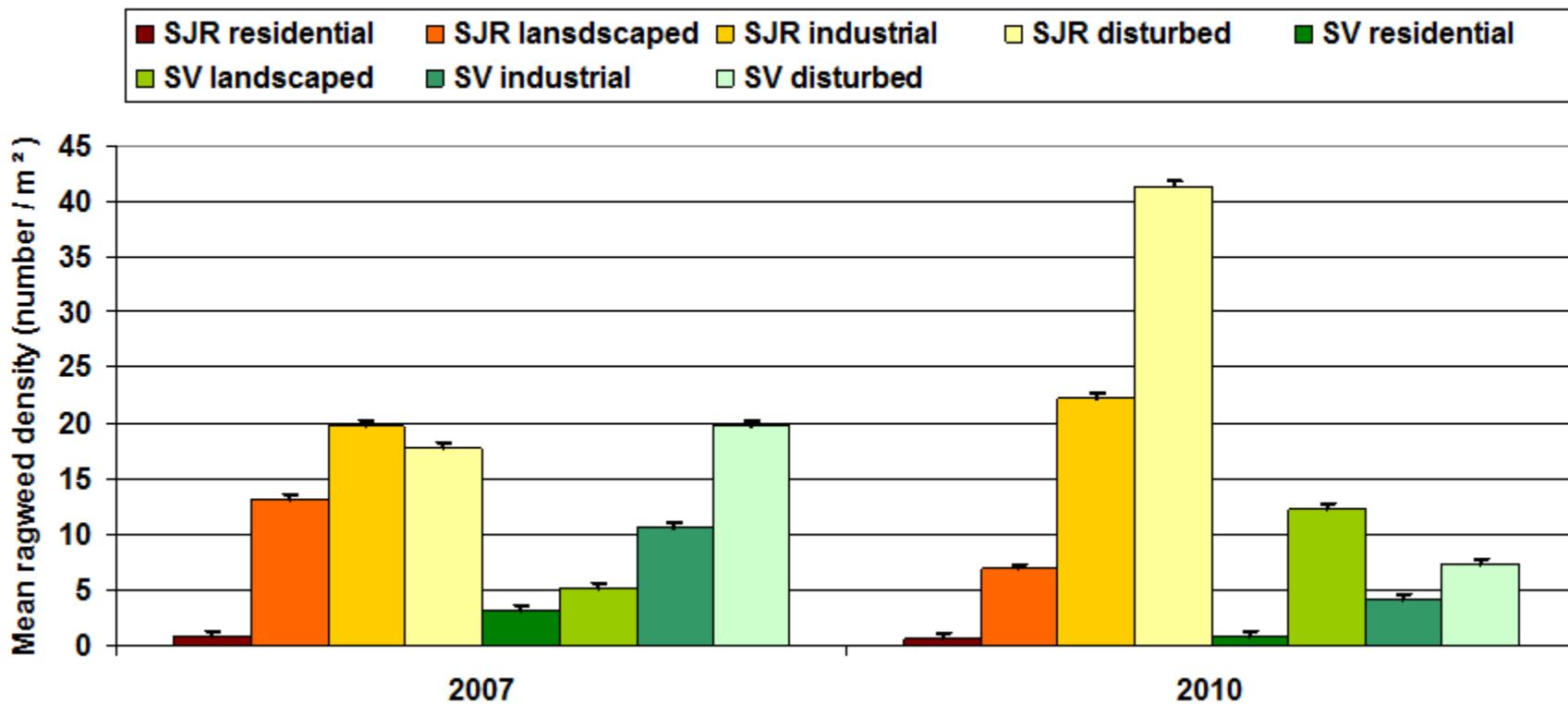
Saint-Jean-sur-Richelieu control city		2010			
		residential	landscaped	industrial	disturbed
2007	residential	NS	**	***	***
	landscaped	***	NS	NS	NS
	industrial	***	NS	NS	NS
	disturbed	***	NS	NS	NS

Salaberry-de-Valleyfield mobilized city		2010			
		residential	landscaped	industrial	disturbed
2007	residential	NS	NS	NS	NS
	landscaped	NS	NS	NS	NS
	industrial	***	NS	NS	NS
	disturbed	***	NS	NS	NS



Mean ragweed density by habitats in both cities 2007 vs 2010

Selective sampling

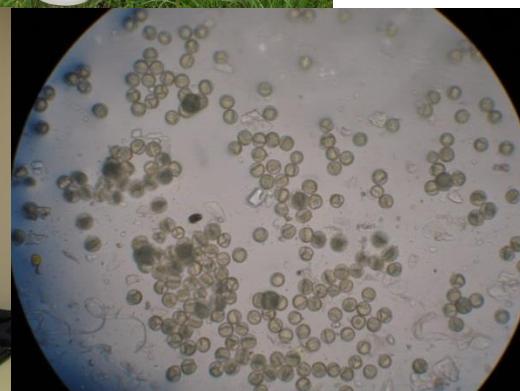


Urban ragweed inventory In Summary



Pollen inventory – M & M

- Distribution of pollen samplers
 - 15 rotorods / city
 - 3 rotorods / habitat (1.5 m height)
 - 4 urban habitats / city
 - 1 regional rotorod(15 m height)
- Sampling procedure
 - 12 consecutive days from mid-August
 - Sampling window: 7h00 - 11h00
 - 10 minutes / hour,
 - Repeated 5 times



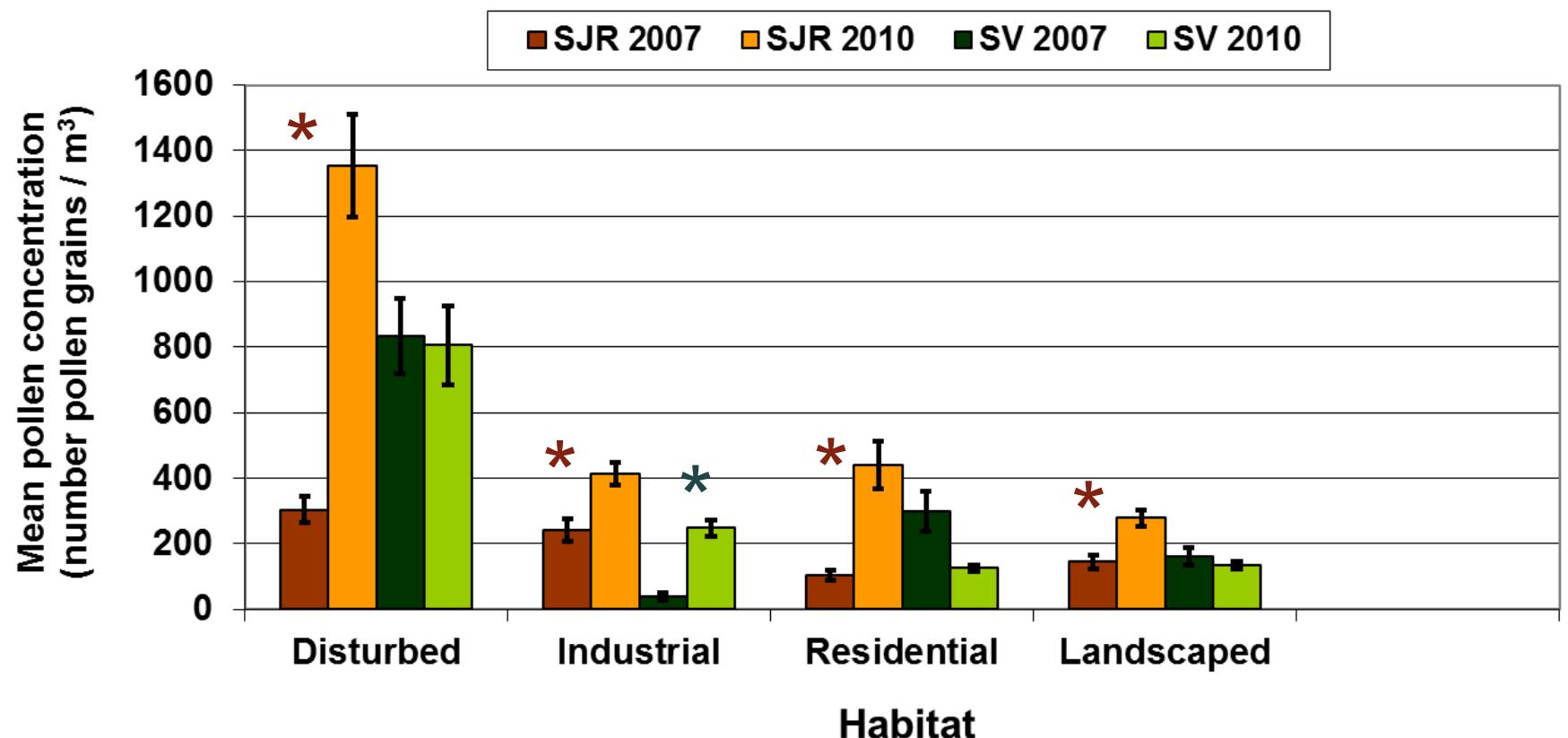
Mean pollen concentration by habitats in both cities 2007 vs 2010

Saint-Jean-sur-Richelieu control city		2010			
		residential	landscaped	industrial	disturbed
2007	residential	**	***	***	***
	landscaped	***	**	***	***
	industrial	NS	NS	***	***
	disturbed	NS	NS	NS	***

Salaberry-de-Valleyfield mobilized city		2010			
		residential	landscaped	industrial	disturbed
2007	residential	NS	NS	NS	***
	landscaped	NS	NS	**	***
	industrial	***	***	***	***
	disturbed	***	***	***	NS

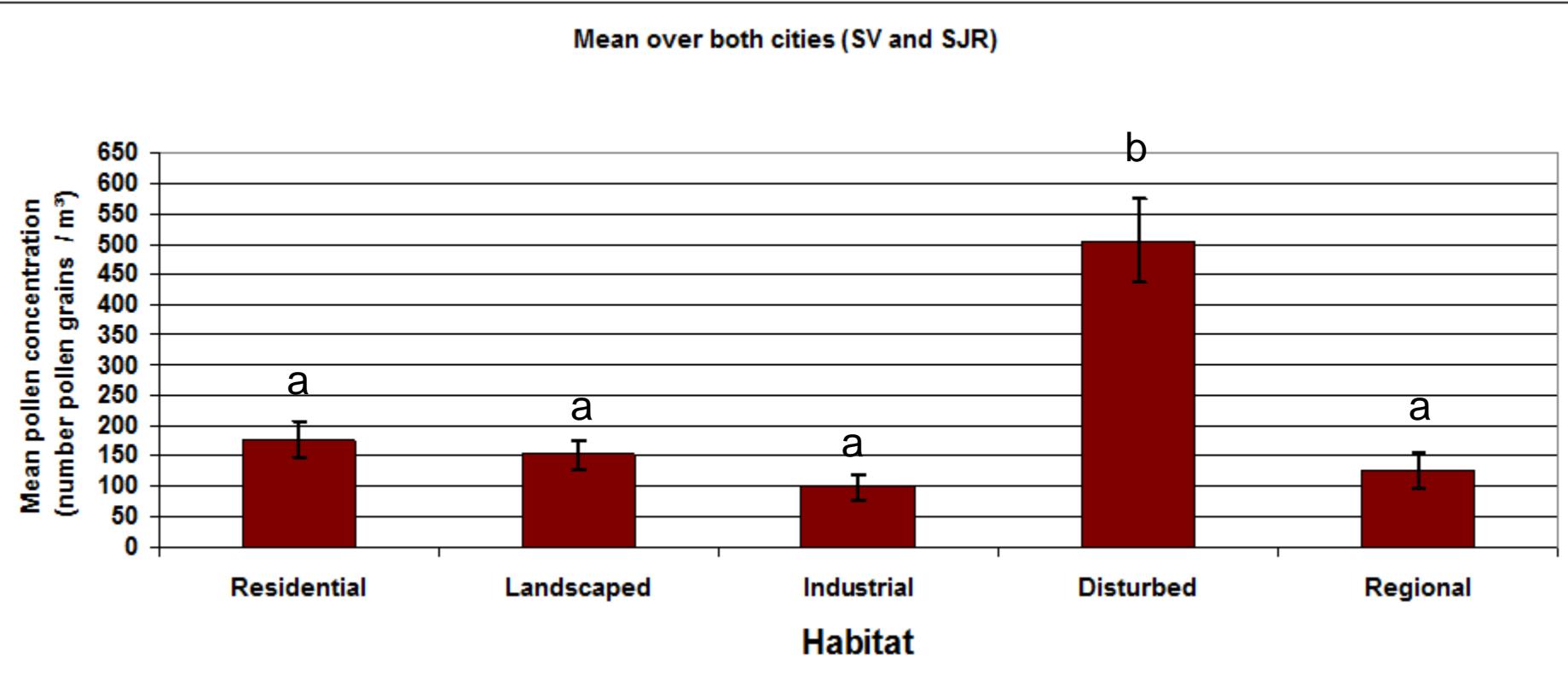


Mean pollen concentration by habitats in both cities 2007 vs 2010



Mean pollen concentration by habitat

~ cities & years confounded ~



Airborne pollen inventory

In summary





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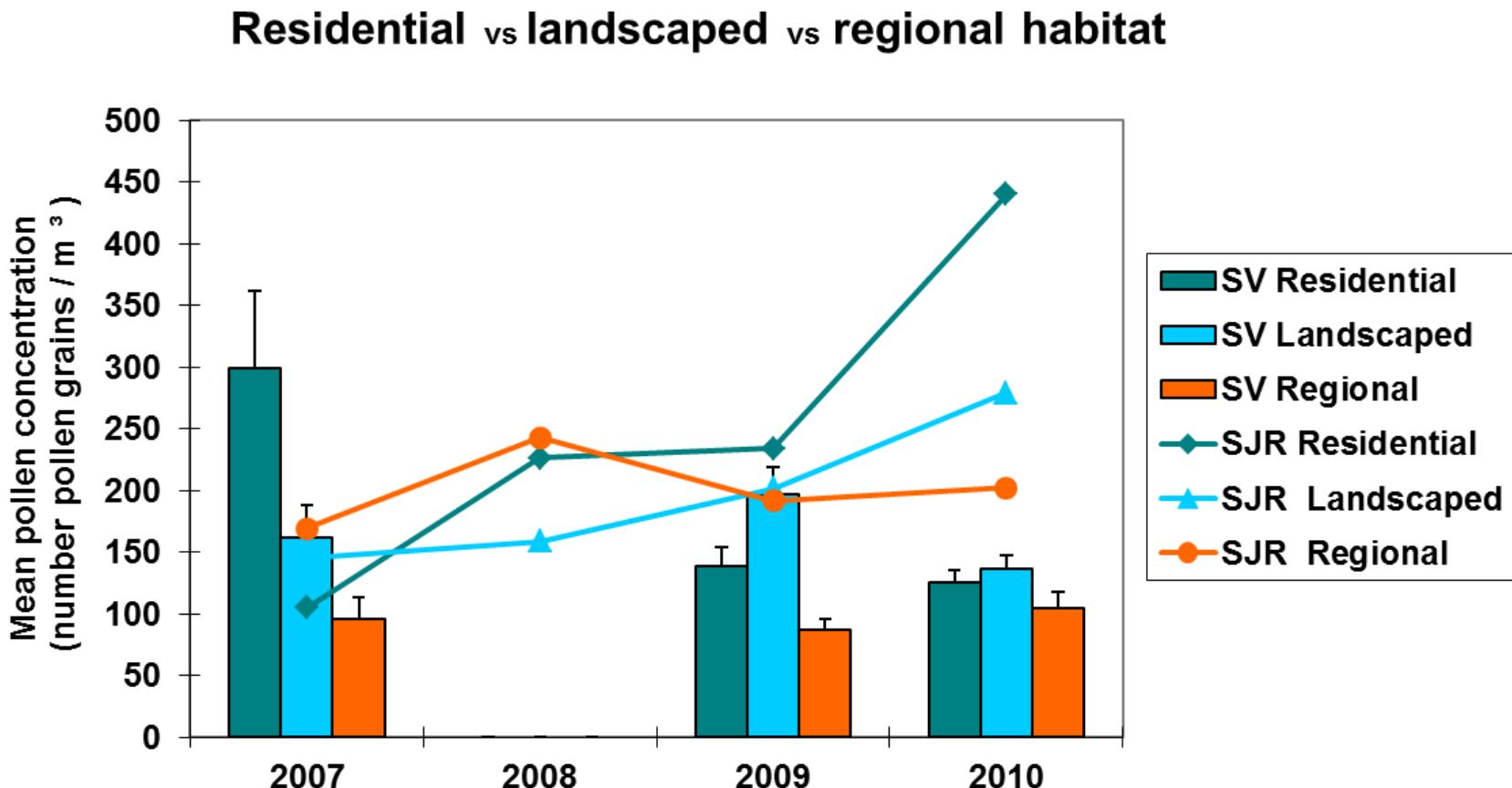


Thank you!

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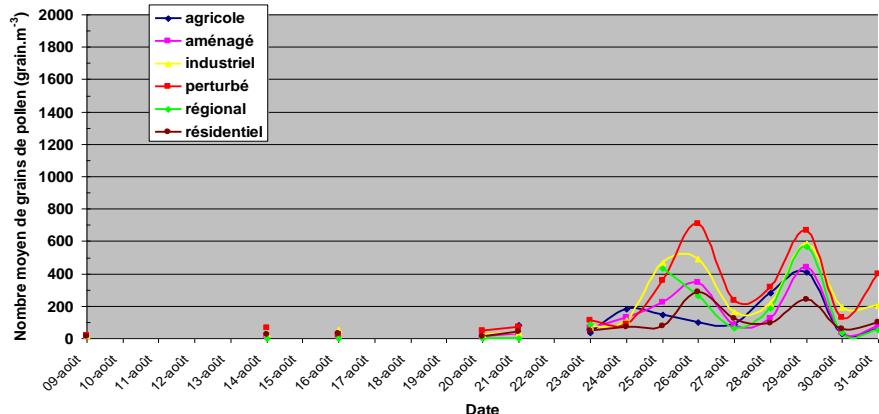
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Mean pollen concentration over study period

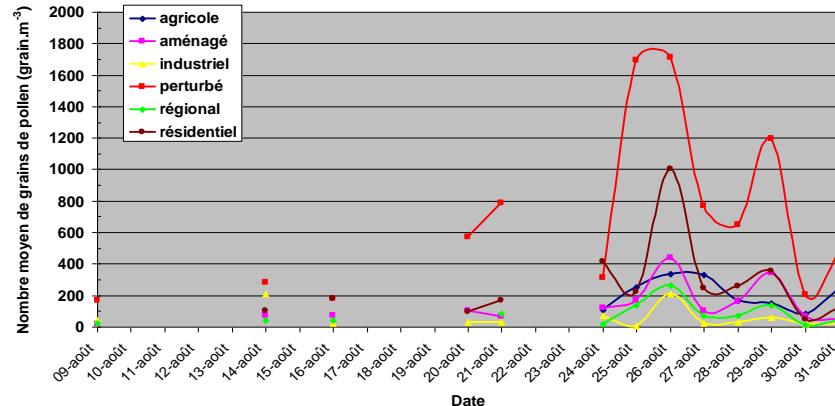


2007

St-Jean-sur-Richelieu 2007

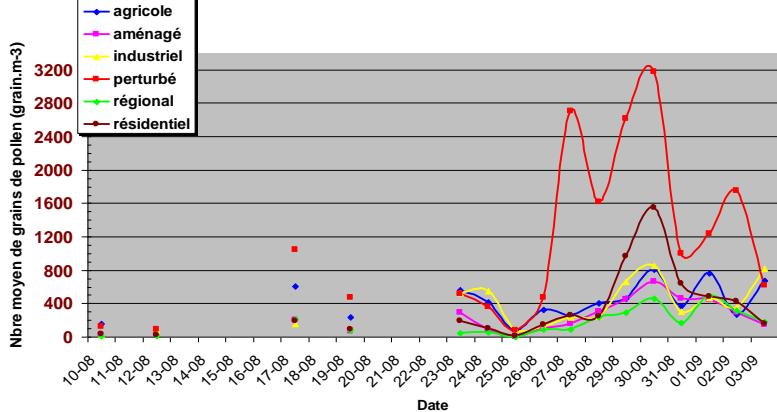


Salaberry-de-Valleyfield 2007



2010

Saint-Jean-sur-Richelieu 2010



Salaberry-de-Valleyfield 2010 (capteur #11 exclus)

