#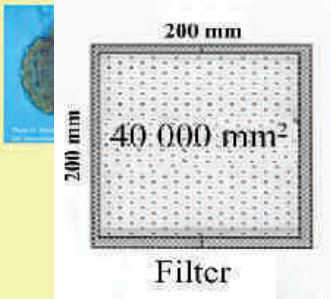 An innovative method, the dust flux one allows an evaluation of the short ragweed fight of a municipality (or other administrative structures)

Chantal Déchamp[1], Henriette Méon[1,2]

[1]French foundation for ragweed study
[2]Université Claude-Bernard Lyon1

International Ragweed Congress Lyon March 28-29 2012

The ground dust flux method

200 mm

40 000 mm²

Filter

The pollen trap in MétéoFrance site

LYON

METEO FRANCE

Deposited pollen on a <u>dry</u> ground are able to be put in air suspension by a current of air with turbulences. To obtain pollen, two filters fixed on the rear of a car,

www.ville-saint-priest.fr

PEUGEOT PARTNER

SAINT-PRIEST

9449 TM 69

collect the dust cloud raised when the car is going at about 40km/h. These filters are the same than those used for pollen counts with AFEDA traps. Then the filters are treated in the labo-ratory. *No concrete: only earth.*
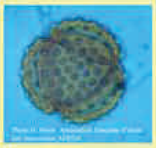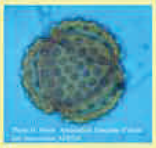
Why do we use
a ground dust flux method ?

Municipalities need a control system

for assessing the effectiveness of their fight

against common ragweed.

They ask this control, because:

- they would like to be not alone to realize this fight,

- they think that such studies could stimulate

neighbourhood to realize the same fight.

Aims of the study: 1

To study on 3 different tracks:
Ambrosia (A) **counted pollen,**
A **pollen per dust gram,**
A **pollen per km,**
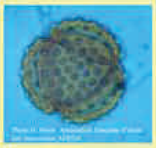**and their %** *vs* **total pollen number,**

•**at the end of an** *Ambrosia* **pollen season (2010)**
and at the start of the following one (2011),
to see what is remaining from the last season

•**at the end of 2 following** *Ambrosia* **pollen seasons**
(2010 and 2011),

after a fight against *common ragweed* **realized in 2011**

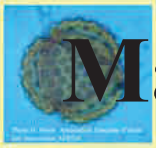Ground pollen

Aims of the study: 2

To compare

A ground dust flux pollen percentages

to *A* atmospheric pollen percentages
of an atmospheric trap (Cour' model)
situated at less than 5 km
of the sampling sites
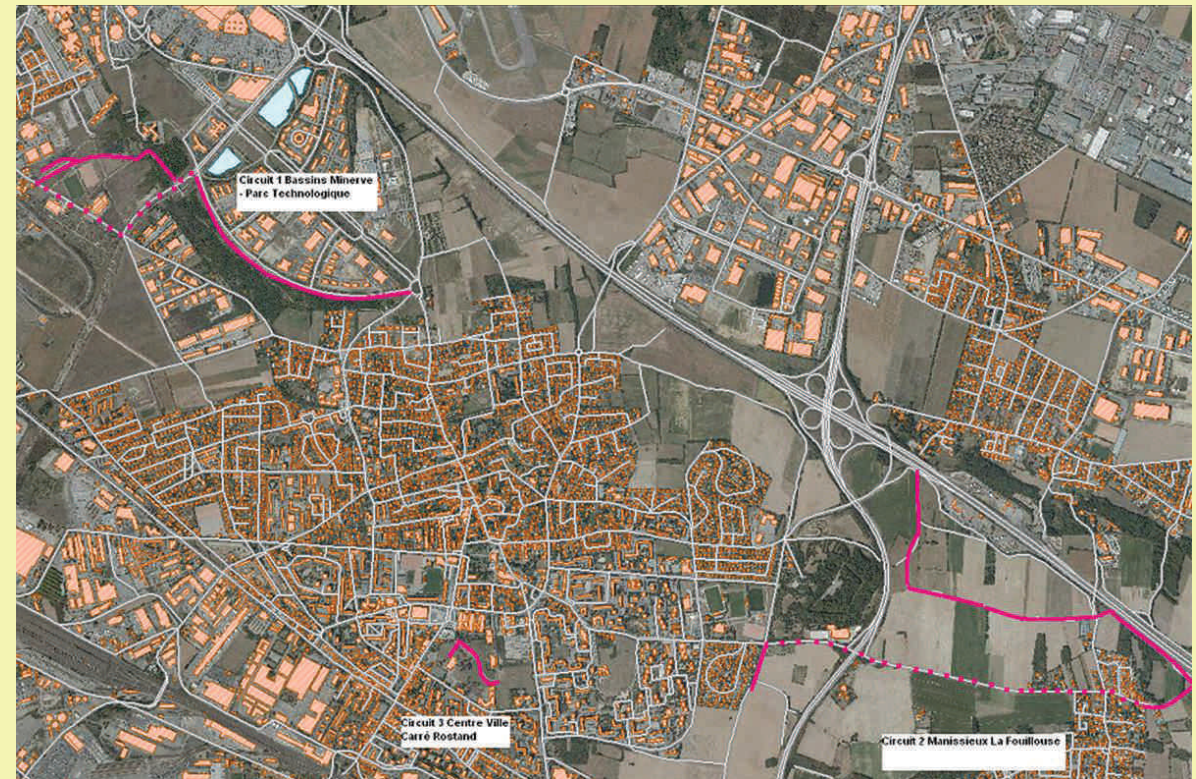during the flux weeks : 30 and 38

Material: three dust flux sampling sites are selected to take in account town diversity and ground heterogeneity: *the same in 2010 and 2011*

1 technologic park (tp);
2 rural area (ra);
3 town centre (tc).

Rhône Department

less than 5 km from the pollen trap

AREAS: these tracks are forbidden to circulation (fences)

Zone rurale AFEDA C.Déchamp

2. Rural area

Parc technologique AFEDA C.Déchamp

1. Technologic parc

3. Town centre

Centre ville AFEDA C.Déchamp

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Meteorological conditions	22/09/10	1/08/11	21/09/11
Precipitations height (mm), 3 days before the dust flux	0 20,21,22/09	0 30,31/07,1/08	0 19,20,21/09
Precipitations height (mm) the day of the dust flux	0	0	0
Cumulated mean temperatures* sum (°C), 3 days before the dust flux	56.1 20,21,22/09	60.7 30,31/07,1/08	45.8 19,20,21/09
Cumulated mean temperatures* (°C) the day of the dust flux	19.7	22.2	15.8

*Minima+maxima/2

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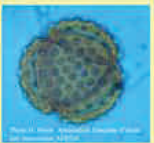
Absolute quantities used for calculating A pollen/dust gram, A pollen/km and their %
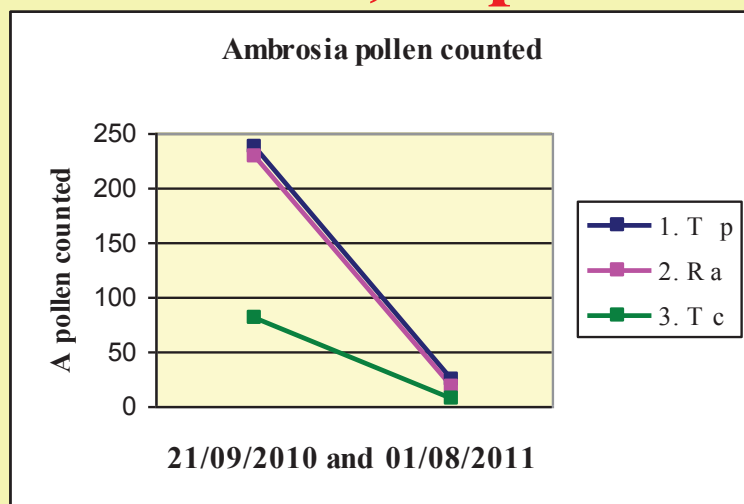## (V: variable)

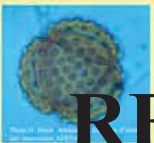| Absolute amounts	Techno Parc: 1	Rural area: 2	Town Centre: 3
Treated surface filter (cm²)	200	200	200
Residue volume (µl)	V	V	V
Res. volume on the slide (µl)	60	60	60
Microscopic prep mean width (µm)	V	V	V
Observed micros. field (µm)	1600	1600	1600
Sample weight (gr)	V	V	V
Sampling distances (km)	V	V	V

RESULTS 1: comparison at the end of an *A* pollen season (2010) and at the start of the following one (2011)
### to see what is remaining for the last season.

At the start of the season: *A* pollen are always at less than 2% of the total pollen; *A* pollen/dust gram have decreased twice; *A* pollen/km always have decreased.

Ambrosia pollen counted

A pollen counted

- 1. T p
- 2. R a
- 3. T c

21/09/2010 and 01/08/2011

Ambrosia pollen /dust gram

Number A p/dust gram

- 1. T p
- 2. R a
- 3. T c

21/09/2010 and 01/08/2011

A pollen percentages/total pollen

A Pollen percentages/ total pollen

- 1. T p
- 2. R a
- 3. T c

21/09/2010 and 01/08/2011

Ambrosia pollen/kilometre

A pollen/km

- 1. T p
- 2. R a
- 3. T c

21/09/2010 - 01/08/2011 -

Congress
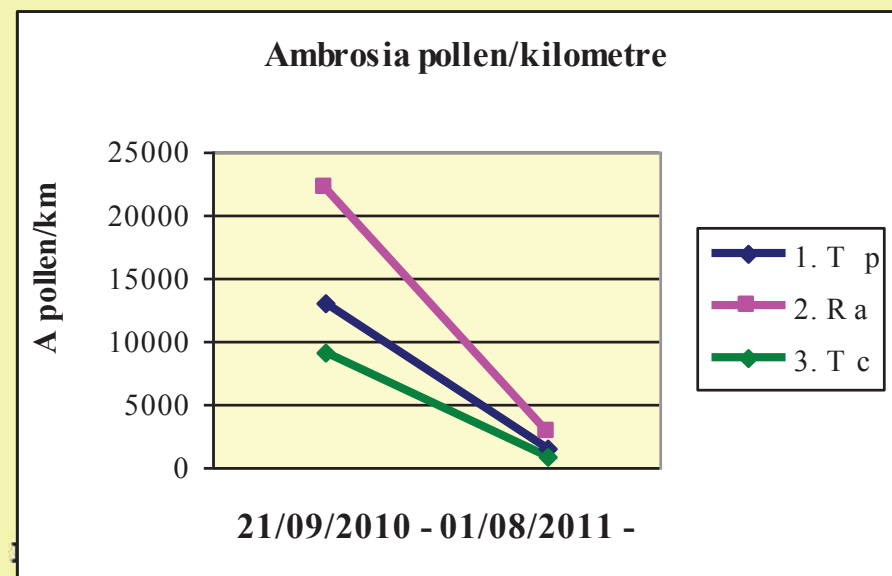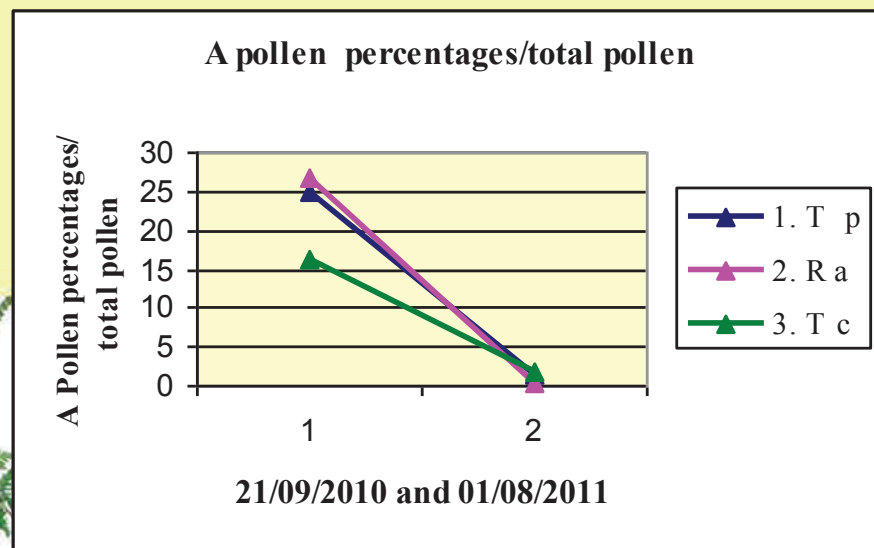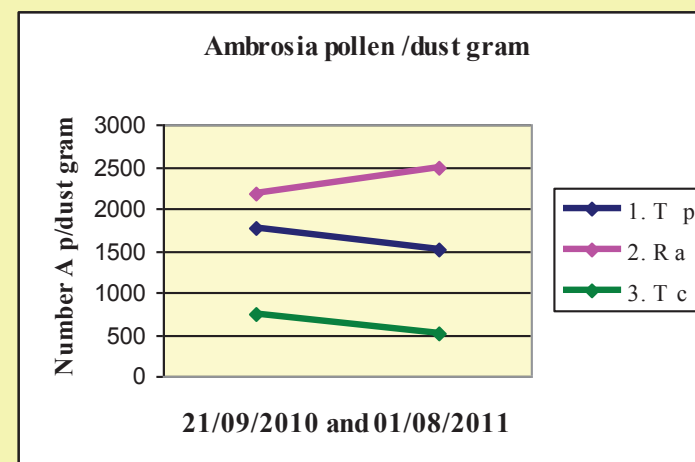
RESULTS 2: comparison at the end of *A* pollen seasons 2010 and 2011, after a fight: counted *A* pollen and % decrease, *A* pollen/dust gram decrease once, *A* pollen/km decrease everywhere, criterion, *A* pollen/km gives the best results
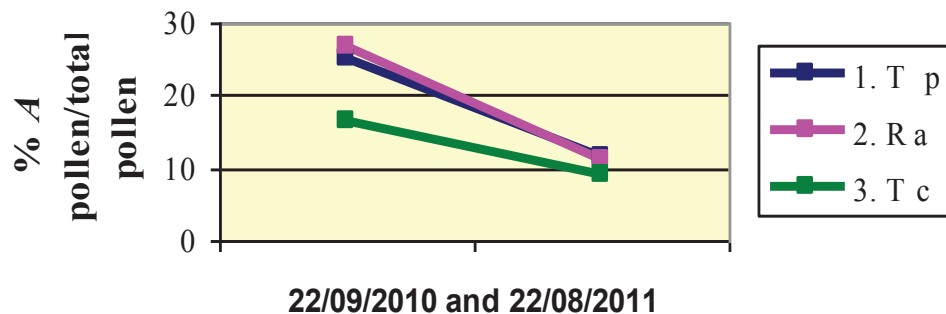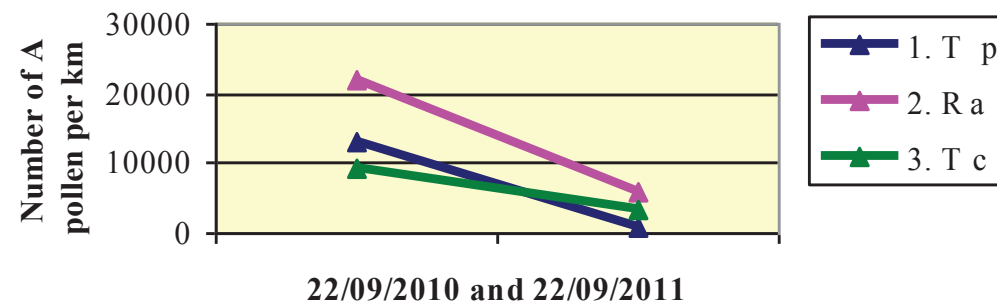

A pollen counted: the ends of the seasons

22/09/2010 and 22/09/2011
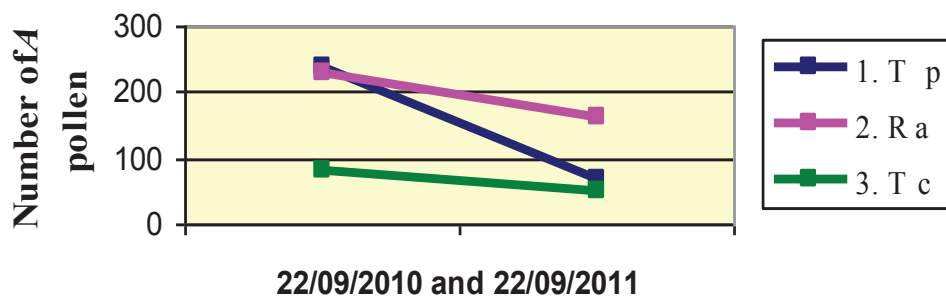
A pollen per dust gram: the ends of the seasons

22/09/2010 and 21/09/2011
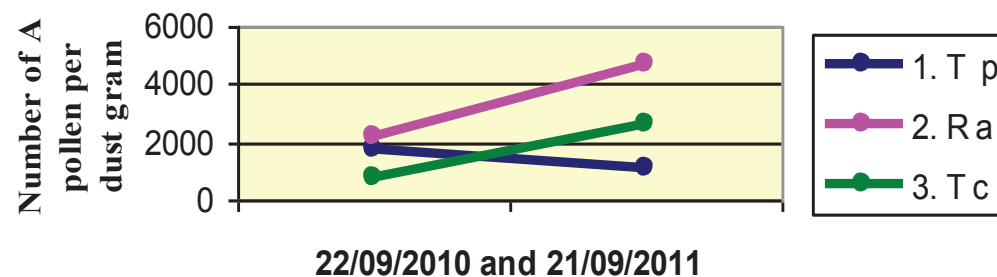
A pollen % /total pollen: the ends of the seasons

22/09/2010 and 22/08/2011

A pollen per km: the ends of the seasons
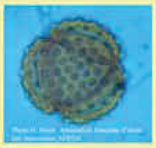
22/09/2010 and 22/09/2011
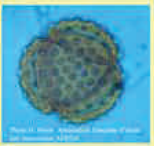
Comparison. *Ambrosia pollen percentages in dust flux and on atmospheric pollen trap: the same week, they are close*

| Week	Year	Techn .Parc	Rural area	Town centre	Dust flux mean 3 sites	Atmos pheric pollen trap
30	2011	1.4	0.2	1.8	1.1	1.2
38	2010	25	27	16	22.7	21.4
38	2011	11.5	11	9	10.5	9

Discussion 1

This method depends on a lot of conditions.

So we must study a lot of criteria…

1) Pollen must be **counted** then evaluated by **dust gram** (that depends on the type of ground, its humidity, meteorological conditions…) and by **kilometre** (that also depends on the precedent conditions and other ones…).

2) Differently **percentages** of *A* pollen essentially are in function of the surrounding vegetation and thus of the pollination season of each taxon.
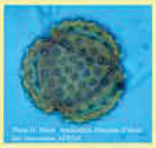
Discussion 2

9 times/9, Ambrosia pollen % on the ground were close to those on the trap, <u>the same week</u>.
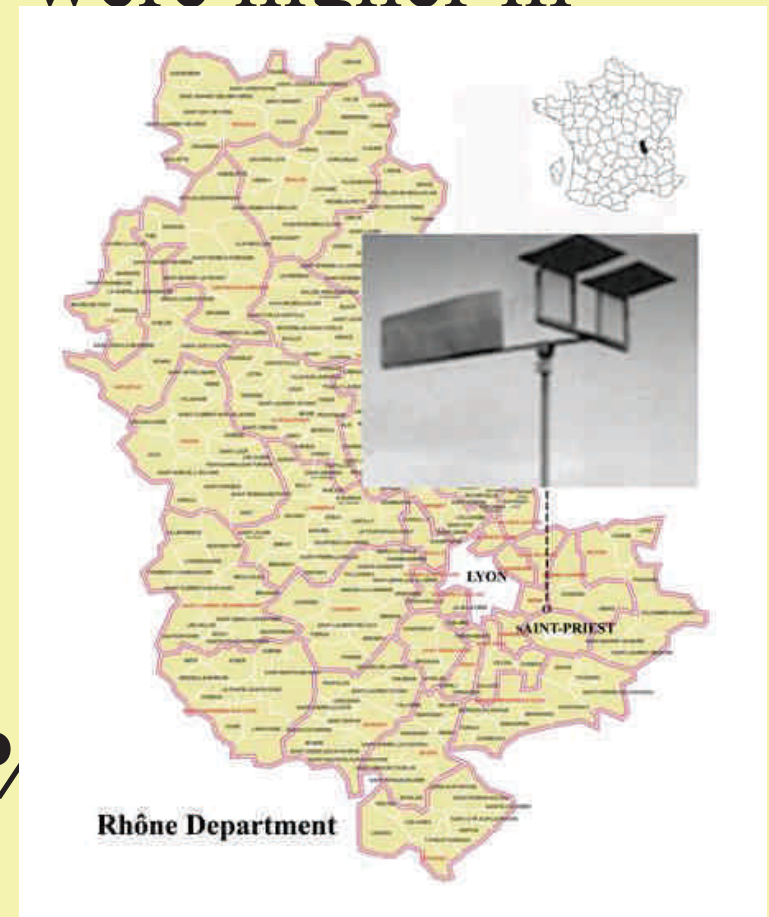
Nevertheless, on the trap *Ambrosia* were higher in 2011 than in 2010 on account of

- meteorological conditions.

-the surroundings towns

 that sent pollen on the trap!

During the 2011 season,

***Ambrosia* pollen increased of 28%**

and total pollen decreased of 6%.

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Conclusions

- **CONCLUSION 1**
  At the start of the *A* season

- **CONCLUSION 2**
  At the end of the 2nd season: after a fight

- **CONCLUSION 3**
 **The profit for the town**

Conclusion 1
At the start of the *A* season

- *A* **pollen have almost disappeared of the ground.**

- 9 (3x3) measures are not sufficient for a conclusion? But we identify about 50 taxons and it is the same thing for other taxa, the season of which we have their pollination: *Cedrus*, *Urticaceae*. Their pollen % are always at less than 2%, before their pollination season.

- **The number of *A* pollen/dust gram** has decreased everywhere except in the "Rural area" (always the most invaded).

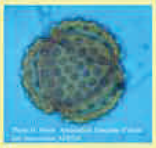- **The number of *A* pollen/km** has always decreased.
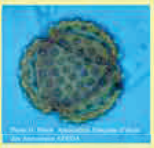
Conclusion 2
At the end of the 2nd season: after a fight

- *A* **pollen percentages have decreased of about 10%.**

- The number of *A* pollen per **dust gram** decrease in "Technologic park" and increase in the "Rural area" and in the "Town centre", nevertheless their percentages decrease everywhere. Ground humidity is a criterion that it is not possible to measure on many kilometres.

- The number of *A* pollen per **kilometre** and their percentages decrease everywhere, **it probably seems to be the best criterion.**

Conclusion 3
The profit for the town

•The decrease of the ground *A* pollen are interesting because that means that plants and seeds have decreased after the fight and therefore will decrease in the futur.

•To a better result on the trap it would be interesting to obtain the same fight by neighbourhing

but transported pollen are able to fly a long way .

•Nevertheless this method could be an interesting way to control the yearly municipality fight. <u>Cheeper than a trap control, it mainly takes in account the town territory</u>.

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Could it be a mean to compare ground pollen % and air pollen % in function of the distance of the trap ?

New measurements would be necessary.
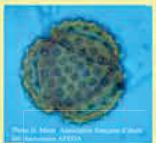
References: this method was used in many countries since 1973 only to identifye vegetation: Cour P. *et al.*

Have a look on « A new control method for fighting common ragweed : the dust flux method"
Chantal Déchamp, Henriette Méon, Isabelle Farrera, extended abstract

http://www.wsl.ch/epub/ewrs

Savanna

Fluxage au sol dans le Sahara   Pierre Cour   1972

Fluxage en savane   Pierre Cour   1972

Sahara Desert

Perhaps the next !

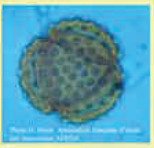Thanks due to Isabelle Farrera (SUPAGRO) for having made analyses

Inter...   28-29 2012

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Thank you for your attention

We have constituted
an international working group:
"Ambrosia pollen flux at the ground surface"

To join this group, please join the authors

Thank you