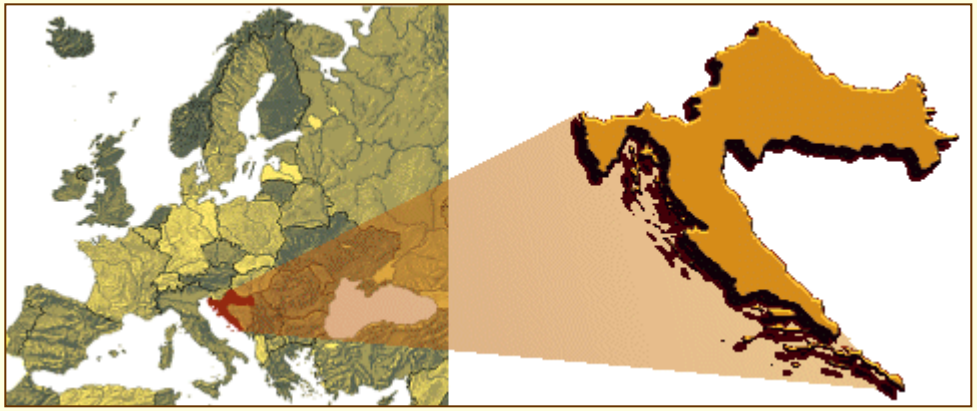
2nd IRC, Lyon, France, March 28-29, 2012

RAGWEED IN CROATIA – CORRELATION BETWEEN PLANT DISTRIBUTION AND AIRBORNE POLLEN



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STRATEGY AGAINST INVASIVE ALIEN SPECIES (IAS) IN CROATIA
(the first national project in 2006):

- the national criteria and standards for terminology (Mitić et al. 2008: Nat. Croat. 17: 73-90)

- preliminary list of invasive alien plants in Croatia (Boršić et al. 2008: Nat. Croat. 17: 55-71) – 65 taxa

- database of alien plants in Croatia - incorporated in the FCD- recommended by State Administration as the national database for flora

- dissemination of the information and public awareness

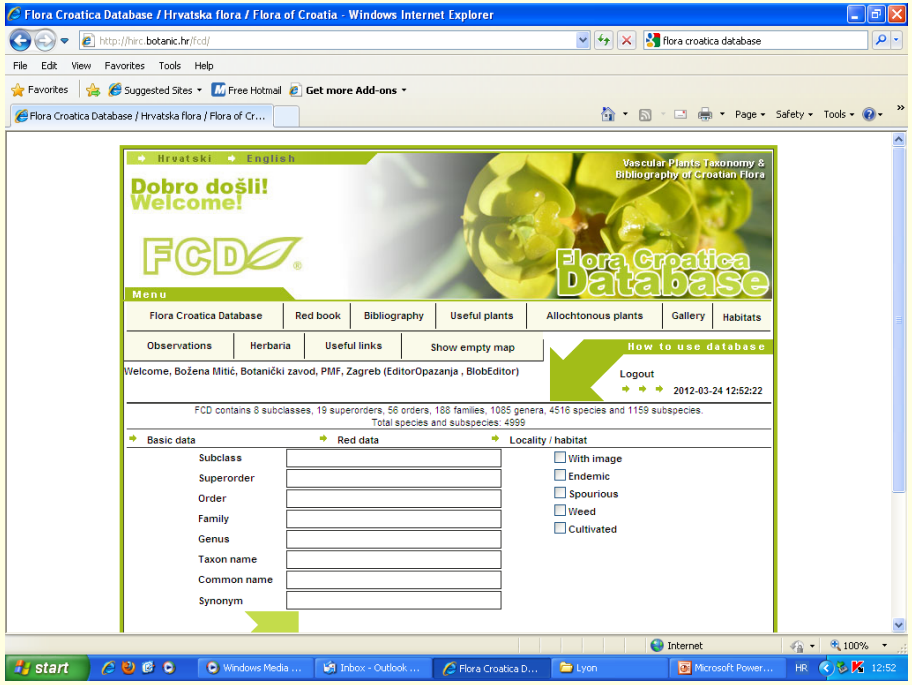
- IAS monitoring and documentation of threats – NO ORGANIZED EFFORTS, case studies (Galzina et al. 2010: ACS 75: 75-81; Jelaska et al. 2010: ASBP 79(4): 285-294; Mitić et al. 2010: Neobiota conf., Prague; Mitić et al. 2010: Neobiota conf., Copenhagen)

- multidisciplinary researches on national level - proposals for possible management and/or prevention options – NO ORGANIZED EFFORTS

Flora Croatica Database (FCD) (www.botanic.hr)

•Tool for different types of expert and scientific work on flora, data dissemination and education
•Started as a scientific project in 1993. - continuous development up to now
• Support from national and international projects, Supported by Ministry of Science and Technology, State Institute For Nature Protection, Fund for Energetic Efficiency and Environement Protection, but mostly Faculty of Science Uni ZG
•Croatian Academic Network support (CARNet)

•Professionals could participate Directly in FCD data accumulation and shering (access permission)
•Number of field workers low, mostly professionals - "bottle neck": to be changed!

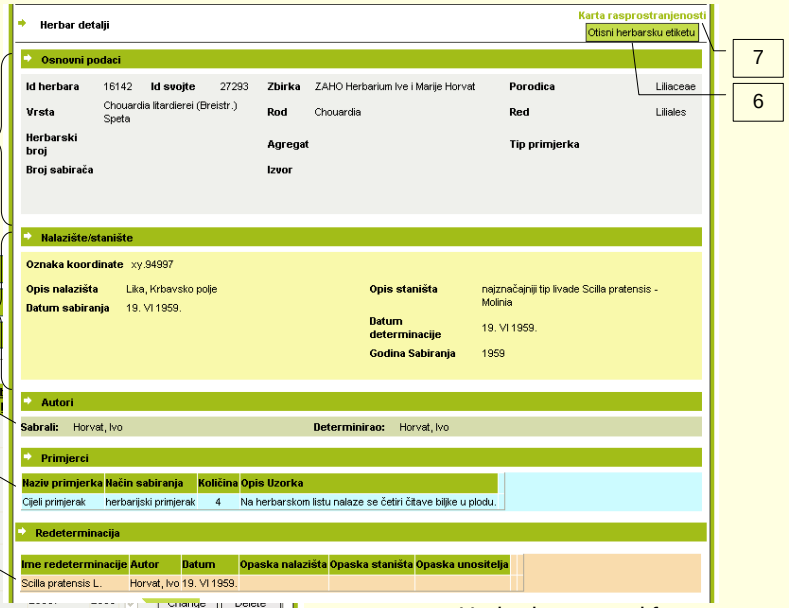


Main FCD purposes and functions:

- Taxonomy and systematics for 5618 taxa of Croatian flora (sp. and ssp. levels)
- Nomenclature (validation, synonyms, sources for nomenclatural issues, etc., cca. 13.000 recorded synonyms, still growing)
- Vernacular names and sources (cca 15.000, still growing)
- Multimedia (image galery, video support) (fotodocumentation for cca 2000 taxa, fast growing)

- Taxa descriptions
- Herbarium management (ZA, ZAHO up to now, cca 20.000 specimens, very slow ....)
- Filed observation management (mostly project dependent)
- Bibliography of Croatian flora and vegetation (cca 8500 literature records, almost finished)

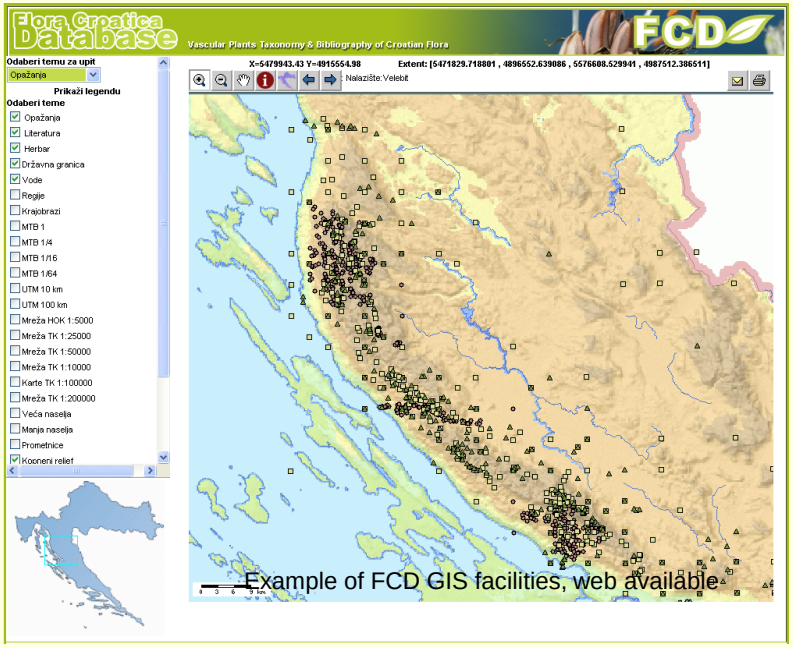
Query form for bibliograaphy



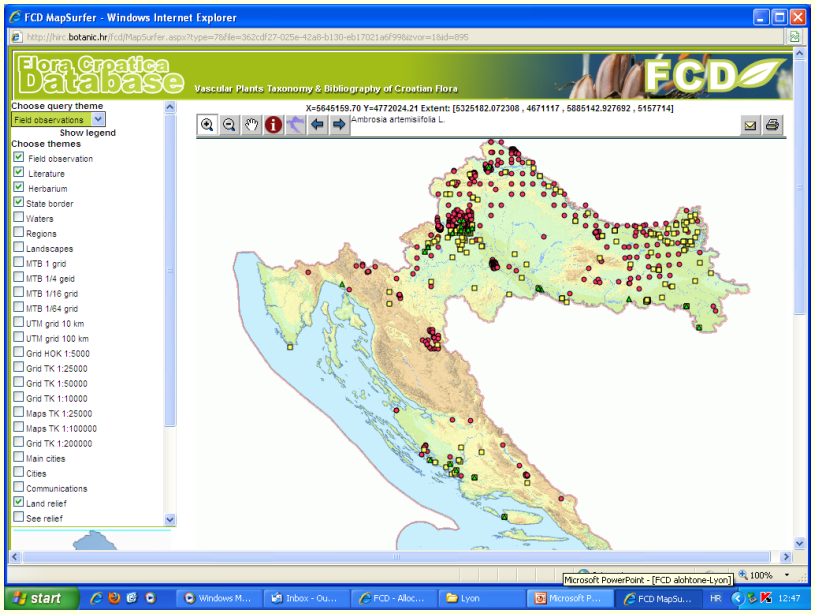
Herbarium record form

List of field observations containing geocoded localities for numerous taxa

- Species distribution data with geocoding facilities, analytical tools
- Map Server and GIS facilities for chorological data, distribution maps (cca 250.000 chorological data, fast growing)
- multiuser & multitasking environment, about 70% fully internet operational, mostly bilingual (Cro/En)
- operation throught the several **MODULES**

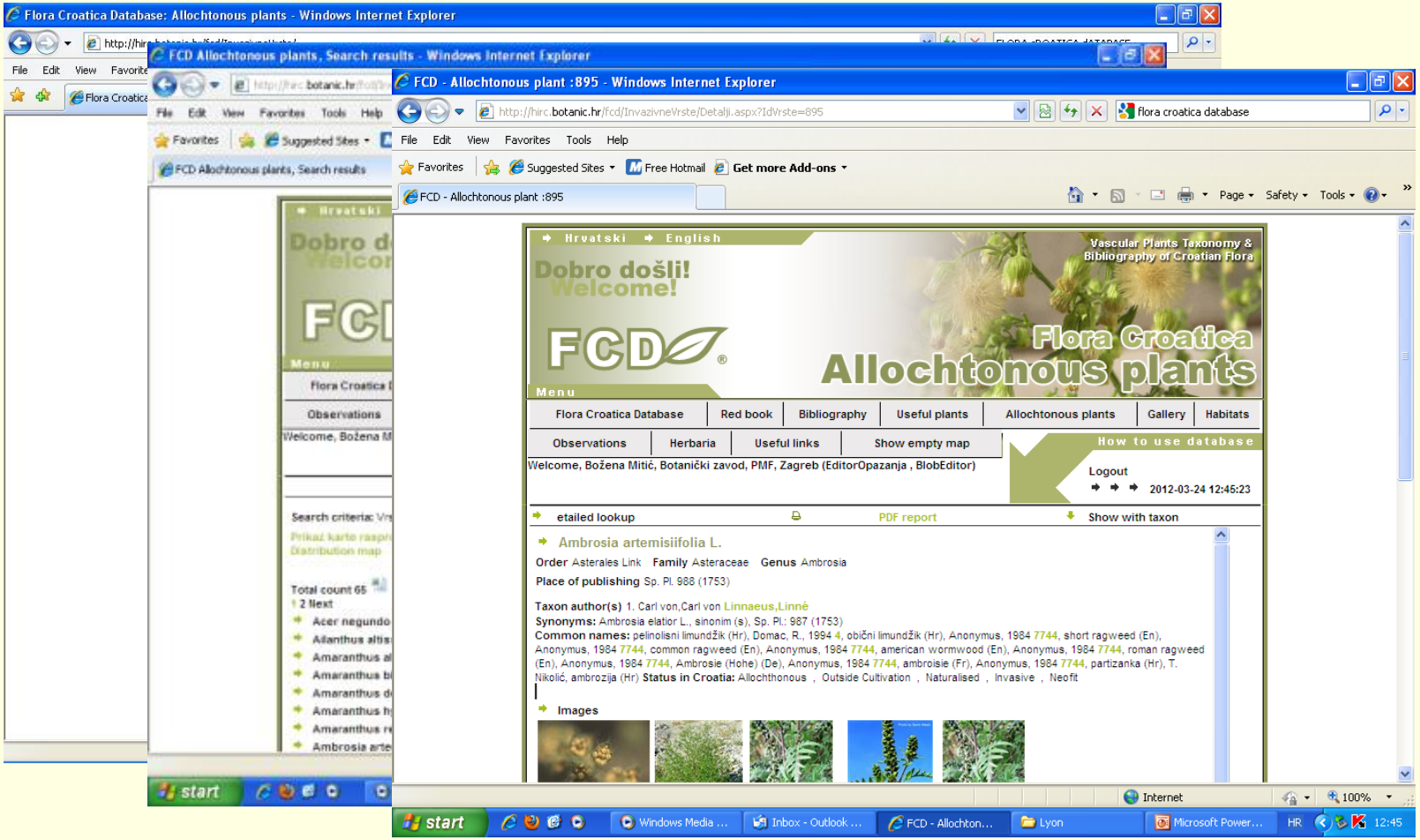


Example of FCD GIS facilities, web available



ALIEN Plants Module

- development during 2006.
- until now, mostly covering IAS



The Genus *Ambrosia* L. in Croatia:

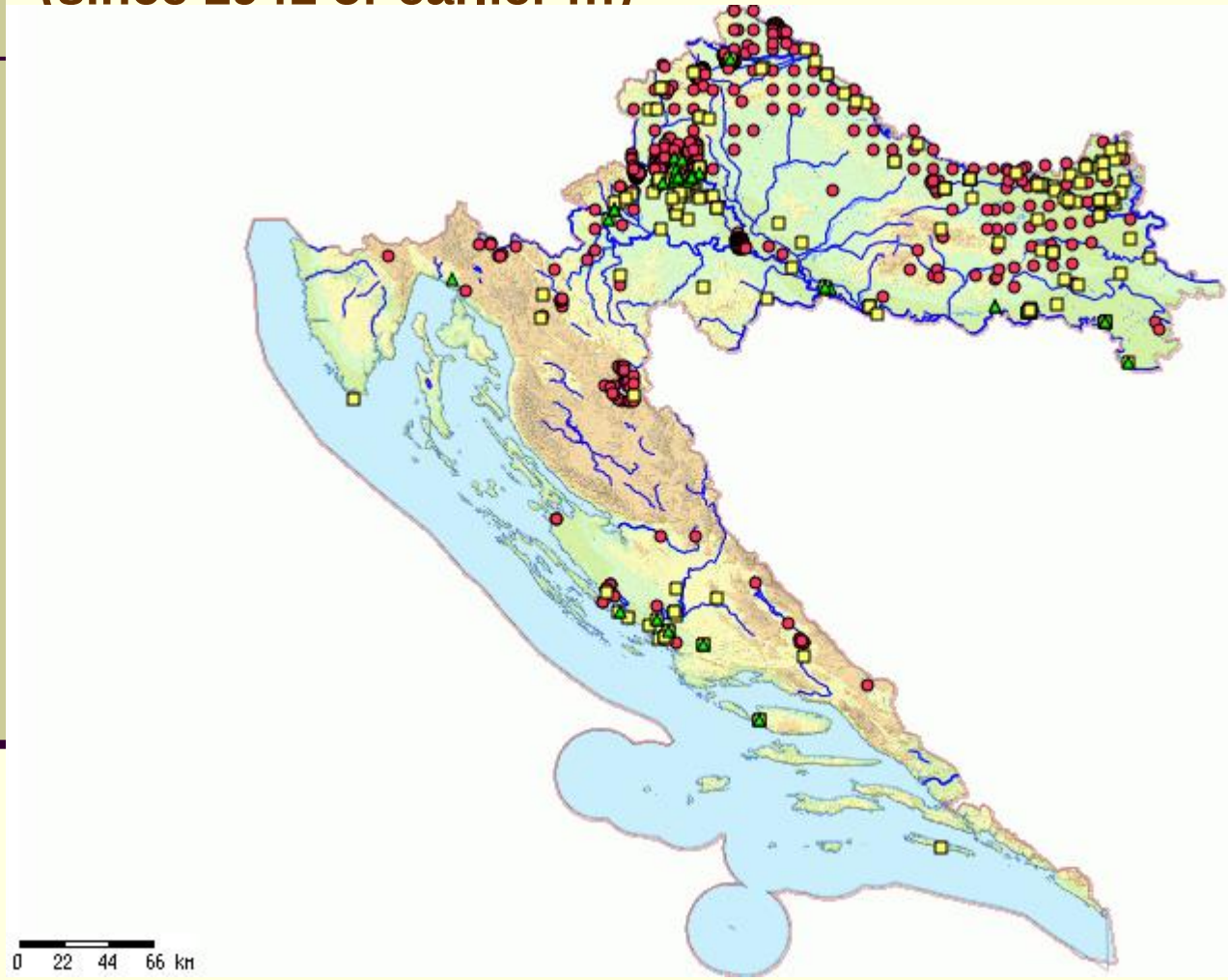
***Ambrosia artemisiifolia* L. - IAS**

***Ambrosia coronopifolia* Torr. et Gray – alien, naturalised**

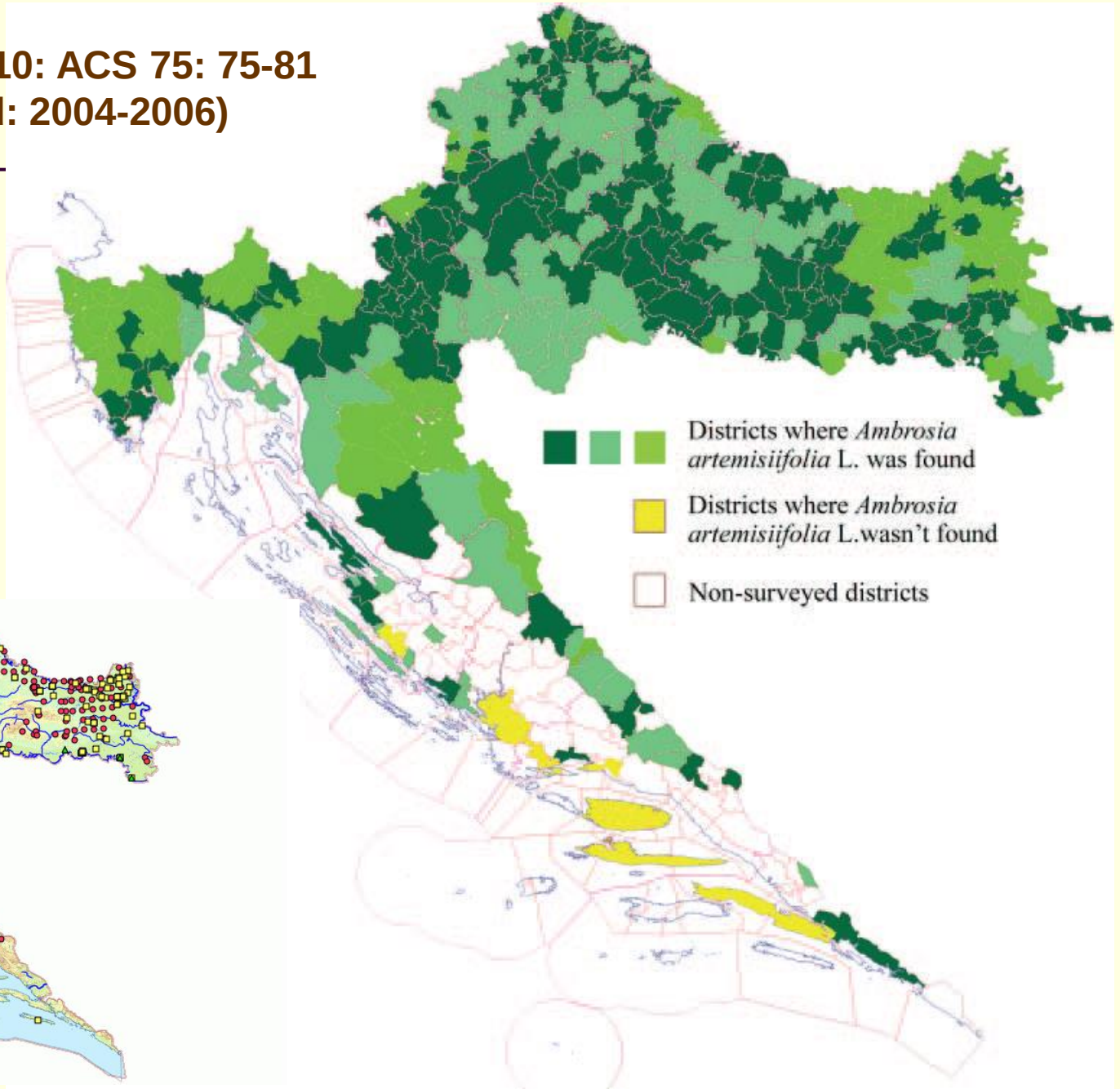
***Ambrosia maritima* L. - native**

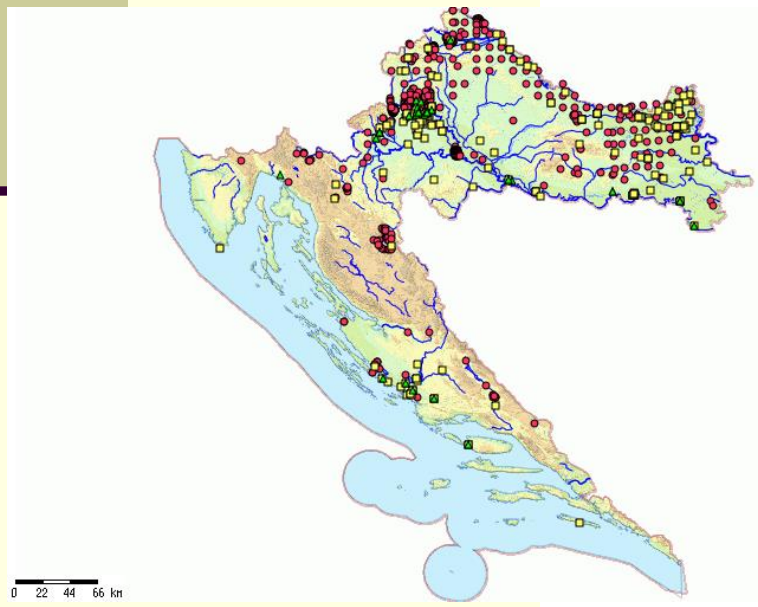
Ambrosia artemisiifolia L.

(since 1941 or earlier …)



Galzina et al. 2010: ACS 75: 75-81 (Research period: 2004-2006)





SIMULTANEOUSLY:
Airborne pollen measurements – volumetric method (since 2001...) - cities of Osijek, Zagreb etc.

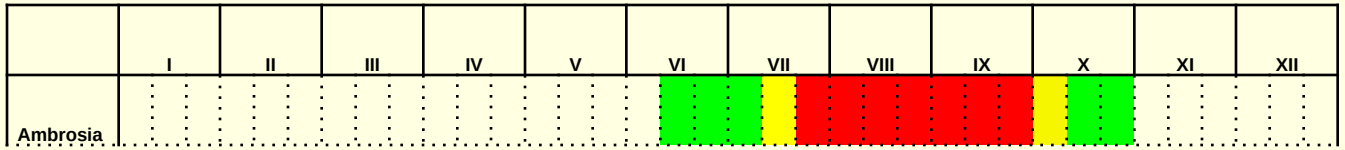
- 16 stations acrooss the whole country (Coordination: Institut of Public Health "Dr. Andrija Štampar", Zagreb; E-mail: ivana.hrga@stampar.hr)
- However…

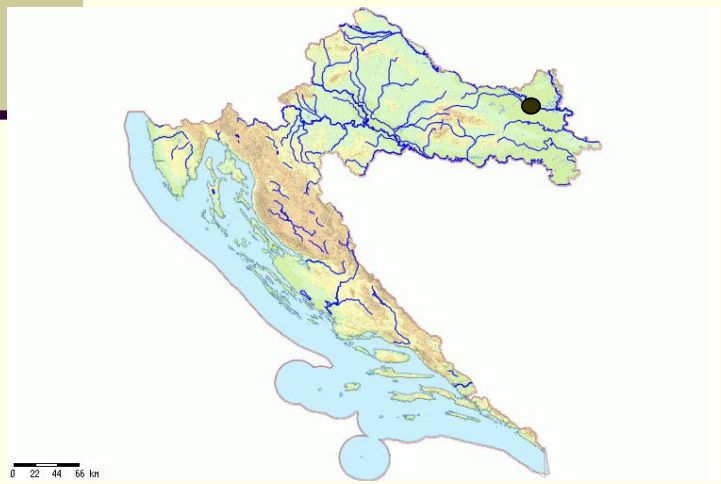
Ambrosia airborne pollen measurements (from 2001)

THE CITY OF OSIJEK

- Štefanić et al. 2005: Ann Agric Environ Med 2005 12: 75–79
- Šušić Z (2010): MSc Thesis etc.

- The higghest concentrations in the morning and forenoon





% OF THE TOTAL POLLEN COUNT:
(PREDOMINATE, 34%)

No. days > 30 PG/m^3: 35

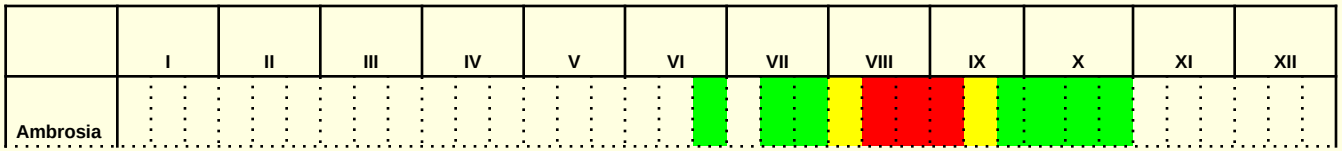
PEAK DAY (PG/m^3): August 29th 2003 (1991)

Ambrosia airborne pollen measurements (from 2002)

THE CITY OF ZAGREB

- Peternel et al. 2005: Ann Agric Environ Med 12: 11-16
- Peternel et al. 2006: Aerobiologia 22: 161-168
- Hrga I (2011): Dissertation Thesis etc.

- The higghest concentrations in the morning and forenoon



% OF THE TOTAL POLLEN COUNT: 14%

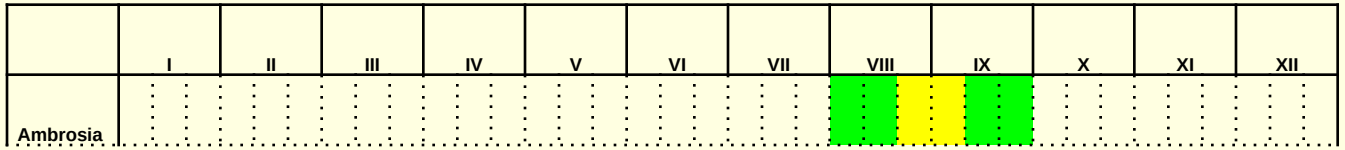
No. days > 30 PG/m^3: 33

PEAK DAY (PG/m^3): September 6th 2003 (883)

Ambrosia airborne pollen measurements (from 2005)

THE CITY OF RIJEKA

- **Furlan N. (2010): MSc Thesis**
- **Higher concentrations in night hours**



<u>% OF THE TOTAL POLLEN COUNT</u>: 0,9 %

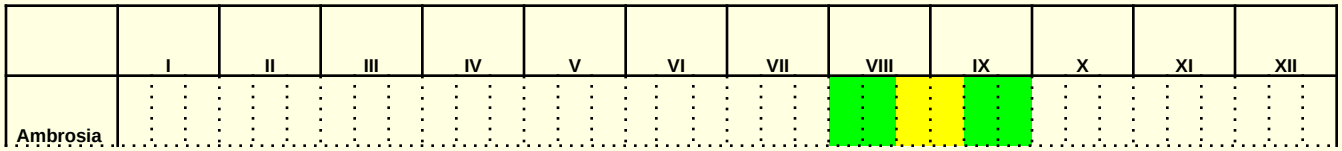
<u>PEAK DAY (PG/m^3)</u>: August 29th 2005 (124)

Ambrosia airborne pollen measurements (from 2006)

- **THE CITY OF ZADAR**

- **Peroš D (2011): Dissertation Thesis**

- **Higher concentrations in night hours**
- **Progressive increasing of Ambrosia pollen concentrations**



% OF THE TOTAL POLLEN COUNT: 1,16 %

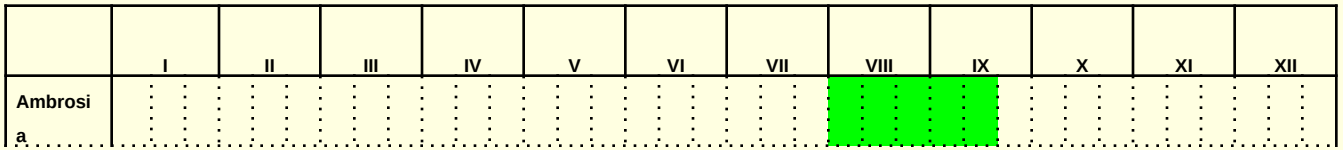
PEAK DAY (PG/m^3): August 31st 2009 (128)

Ambrosia airborne pollen measurements (from 2005)

THE CITY OF SPLIT

- Mileta T (2011): Dissertation Thesis

- Higher concentrations in night hours
- Increasse of Ambrosia pollen concentration in 2009



% OF THE TOTAL POLLEN COUNT: 1,01 %

No. days > 30 PG/m^3: 5

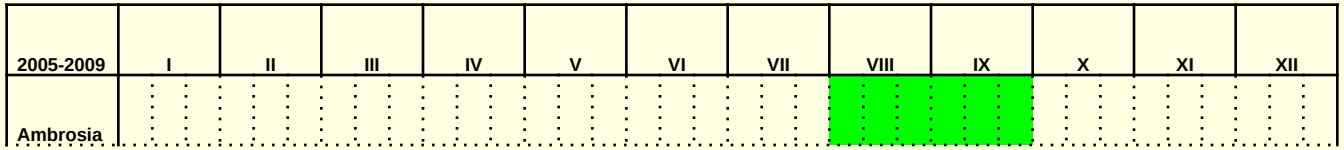
PEAK DAY (PG/m^3): August 31st 2009 (98)

Ambrosia airborne pollen measurements (from 2005)

THE CITY OF DUBROVNIK

- Dolina K (2012): Dissertation Thesis

- Higher concentrations in night hours
- Increasse of Ambrosia pollen concentration in 2009

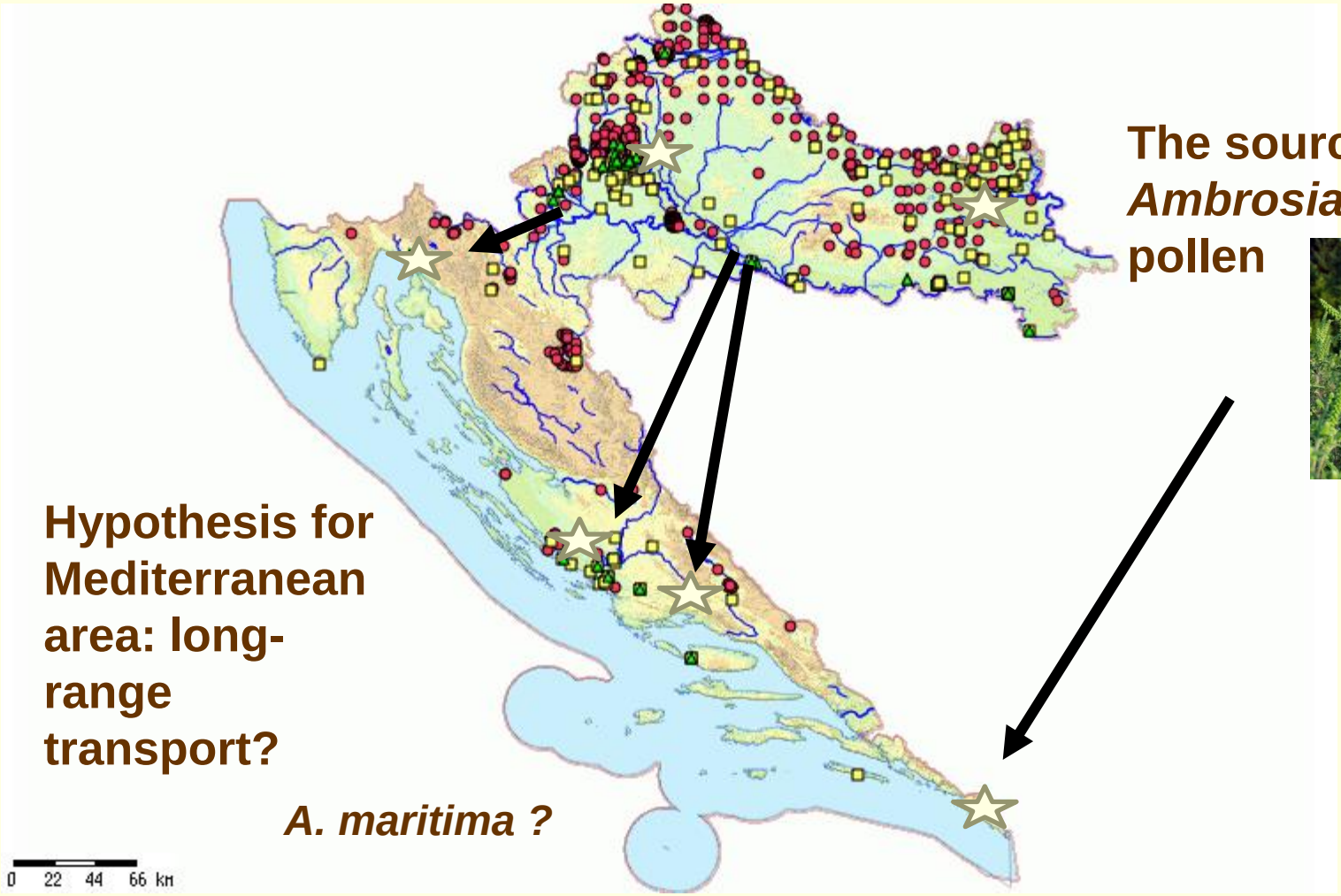


% OF THE TOTAL POLLEN COUNT: 0,8 %

No. days > 30 PG/m^3: 2

PEAK DAY (PG/m^3): September 11th 2009 (48)

CORRELATION BETWEEN *Ambrosia* DISTRIBUTION AND AIRBORNE POLLEN



Ambrosia PROBLEM IN CROATIA - WHAT WAS DONE SO FAR?

- Mechanical erradiction (more or less effective in towns, almost without effects in rural and “natural” areas)

- Chemical treatment (non-selective herbicides, effective on smaller surfaces and young plants)
-
- Biological measure: the ragweed leaf beetle *Zygogramma suturalis* :
Failure (no positive reports since 1995)

Dissemination of information:

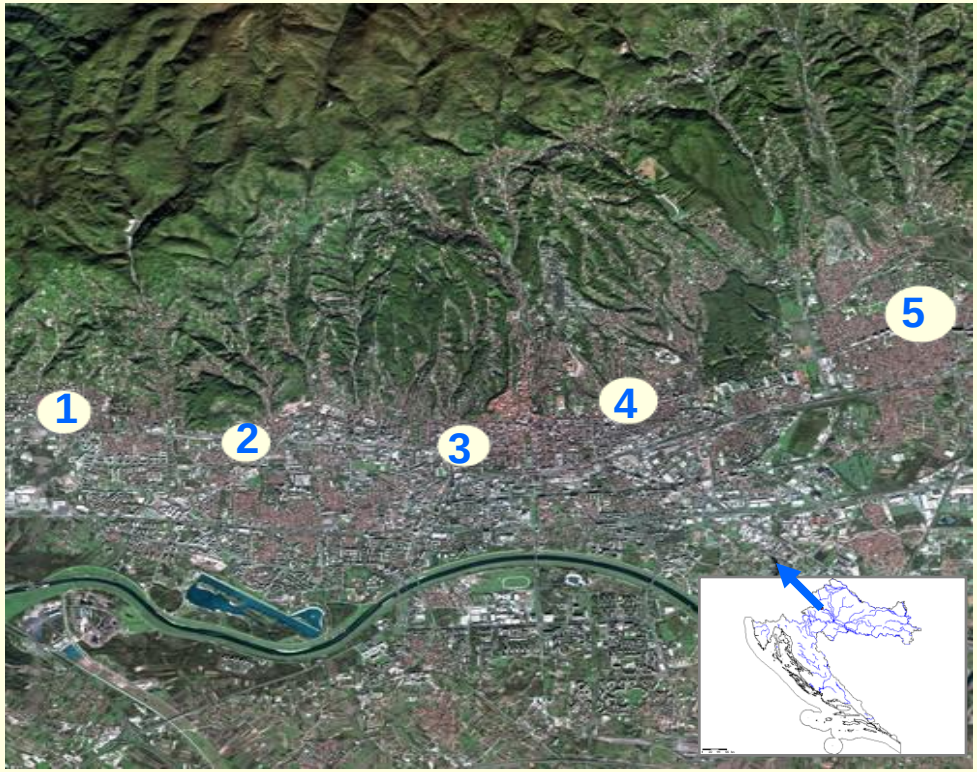
- since 2002 – actions against *Ambrosia*

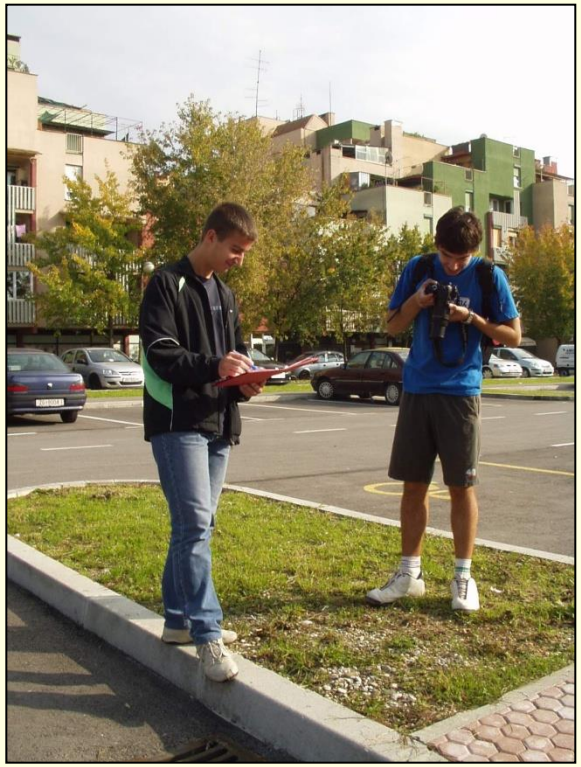
- since 2004 – legal commitment to erradicate *Ambrosia*

CASE STUDIES

– e.g. Distribution of IAS in the City of Zagreb, Invasive plants of the Zagreb county, Urban flora of the city of Zadar…

- **ON THE FIVE AREAS IN THE CITY OF ZAGREB (cca 5 km^2) - located linear, from the east to the west city border**





Ambrosia PROBLEM IN CROATIA – PLANS FOR THE FUTURE?

- further accumulation of distribution data in FCD
- further accumulation of aerobiological data
- monitoring and documentation of threats on both biodiversity and human health
- dissemination of the information and public awareness
- multidisciplinary researches - suggestions for possible management and/or prevention options
- collaboration with other researchers in Croatia and Europe (COST Smarter?)

Special thanks to collaborators:

- **Prof.Dr. Toni Nikolić** (University of Zagreb, Faculty of Science)
- **Dr.sc. Ivana Hrga, Dr.sc. Barbara Stjepanović** (Institut of Public Health “Dr. Andrija Štampar”, Zagreb)
- **Mr.sc. Zdenka Šušić** (Institut for Public Health of the Osijek-Baranja county, Osijek)
- **Dr.sc. Tatjana Mileta** (Educational Department of Public Health of the Split-Dalmatia county, Split)
- **Mr.sc. Katija Dolina** (Institute for Marine and Coastal Research, Dubrovnik)
- **Dr.sc. Danijela Peroš Pucar** (Health Ecology Service, Public Health Institute, Zadar)
- **Mr.sc. Nikolina Furlan** (Educational Department of Public Health of the Primorsko-Goranska county, Rijeka)


Thank You for the attention!