measurements of the concentrations of carbon dioxide and airborne microflora in the air have been made. Aerobiological and chemical monitoring was carried out at six different points located along the visitor path. Studies were conducted when the cave was both open and closed to the public.

Results of the chemical and biological studies show that the average values of carbon dioxide and of the total concentration of bacteria and fungi are well above the safety threshold. Maximum values of CO^2 and of heterotrophic bacteria and fungi were recorded when the cave was open to the public. Analysis of the microclimatic trends show that most of the cave is subject to high levels of relative humidity, and as a result, conditions of saturation with phenomena of condensation on the walls occur during a large part of the year.
As far as the distribution of chemical and biological pollutants is concerned, the areas where materials and human health is exposed to maximum risk are those furthest inside along the visitor path (Cavern of Cybele and Cellar of Cybele).

The overall analysis of the results obtained show the need to strictly control the flow of visitors with regard to number and amount of time spent within the cave environments. Periodically, the cave should be totally closed to the public to allow its interior environment to reach ideal "physiological" conditions of equilibrium.

ARROYO I., ARROYO G., 1996. Annual microbiological analysis of Altamira cave (Santillana del Mar), Spain. In: J. RIEDERER (Ed)., 8th International Congress on Deterioration and Conservation of Stone, pp. 601-608.
HOYOS M., SOLER V., 1993. La cueva de Nerja (Malaga): ejemplo de degradacion microambiental. In: F. J. FORTEA (Ed.), La proteccion y conservacion del arte rupestre Paleolitico, pp. 95-107, Servicio de Publicaciones del Principado de Asturias, Oviedo.
NUGARI M.P., RICCI S., ROCCARDI A., MONTE M., 2003. Churches and hypogea. In: P. MANDRIOLI E, G. CANEVA & C. SABBIONI (eds.) Cultural Heritage and Aerobiology. Pp. 207-224. Kluwer Academic Publishers, Dordrecht.

Poster session c7

APPLIED AEROBIOLOGY: CLIMATIC CHANGES

Climatic changes: advanced flowering of Graminaceae and Urticaceae recorded in Modena (North of Italy), preliminary study

Natali, P.

Arpa Emilia Romagna – Sez. Prov.le di Modena (Italy) – e-mail: pnatali@mo.arpa.emr.it

From the end of the 1800 the medium surface temperature of the earth it is increased of approximately 0.3-0.6°C. Records since 1860 demonstrate global warming. The 1990s was the hottest decade yet recorded, and the warmest summer was in the 2003.

The United Nations Intergovernmental Panel on Climate change (IPPC) predicts a 1.4 to 5.8°C rise by 2100. Already there is the glacier retreat, poleward shift of animal and plants, and more extreme weather events. The IPPC position that most climate change since 1950 is human induced and will have far-reaching environmental and health effects. Global warming results from interactions between greenhouse gases, the Earth's atmosphere, and the sun. The main greenhouse gases are carbon dioxide ad methane. These along with nitrogen oxides, sulfur oxides, ozone, and halocarbons, are produced by fuel combustion and agricultural activities. Greenhouse gases trap energy in the atmosphere, causing global warming. A baseline level of gases is necessary for a habitable environment, but industrial activities have increased concentrations to levels that induce warming. The upper ranges of carbon dioxide and methane are the highest levels in 420000 years. Concentrations of CO2 are now one third higher than pre-industrial levels. Methane concentrations are twice those of the pre-industrial era, and ground-level ozone levels are unprecedented.

The climate change induces thermal extremes and weather disasters and causes, moreover, longer-term ecologic changes that food availability, allergy and disease exposure, ad emerging infectious diseases.
Climate's influence determine which type of life will develop in every specific area of the Earth especially as concerns vegetables.

Finding out good pointers in order to record the climatic change is very difficult because climate natural fluctuations are remarkable. These are greater if the examination area is reduced. Beyond chemical pointers (CO2 concentration, NO2, CH4, O3, HFC, PFC, SF) and physicists (the minimal and maximum temperature, solar radiation, etc), it can be useful estimate what effects are produced on living organisms, in particular on vegetables essences that, for they characteristic, are extremely sensitive to climatic variations (also inside seasonal periods).

Materials and methods. The present study considers 19 years (1985-2003) of collected pollens data from the monitoring station MO1 in Modena, (a little city in the middle of the Po valley, North of Italy).
In particular we analyse how the beginning of the pollination of Graminaceae and Urticaceae (herbaceous essences abundantly present between April and September) have been changed during the years.
There are many factors and variously interlaced that influence the beginning of the flowering such as the season minimal and maximum temperature, degree/days, wet and dray weather, solar radiation; anyway we have found an advanced flowering trend of these two essences in the considered period.

Results. Applying the Cox and Stuart test, the obtained results evidence a flowering advance of 0,82 days/year (p=0.14) for the Graminaceae and of 0,85 days/year (p=0.09)for the Urticaceae.
Conclusions. The observed advance of the beginning flowering, could be correlated to the increase of the temperature. The pollens, therefore, could be considered as a pointer of the climatic changes. Also knowing that 19 years are a relatively short period in the climate changes study, this preliminary results, however, induce to keep on with the efforts in this direction.

SUPINDATA BUNYAVANICH, M.P. et A.T. (2003). The impact of climate change on child health. In: **Ambulatory Pediatrics**; 3: 44-52.
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2001). Third Assessment Report of Working Group I: The Science of Climate Change. Cambridge, England: **Cambribge Unversity Press.**

Start of the pollen season in some arboreal taxa and winter climate change in Turin (Northern-Italy) from 1983 to 2003

Caramiello, R.[1]; Siniscalco, C.[1]; Mercalli, L.[2]; Fossa, V.[1] & Arobba, D.[3]

[1] Dipartimento di Biologia vegetale, Università di Torino and CEBIOVEM, Viale Mattioli, 25 –10125 Torino, (Italy).
[2] Società Meteorologica Subalpina, via Re, 86- Torino. (Italy).
[3] Ist. Int. Studi Liguri, Museo Archeologico del Finale, Finale Ligure. (Italy).

In recent years, winter temperatures (December-March) in North Western Italy increased of about 1 °C if compared to the previous 30 years. In Turin the period 1983-2003 presented a mean value of the four winter months of 6,1°C,while in the long period 1880-1980 the value is of 4,9°C. In detail, the 1989-90 winter season registered a mean temperature of 8,0°C, the 1996-97 accounted for a 7,8°C mean and the 1997-98 had a mean of 7,0°C, both the highest of the 1753-2003 period. Mild winter temperatures were also accompanied by severe

droughts, as 1988-89 (1 mm from December 3 to February 21), 1996-97 (5 mm from January 24 to May 4) and 1999-2000 (5 mm from December 17 to March 27).

Response of pollen dispersal to this temperature increase has been analysed in early works of the '70ies using the first aerosporological data on short periods (Lejoly-Gabriel, 1978), in the '80ies and '90ies applying mathematical models in particular to some early flowering arboreal taxa and both to rain and temperature data (for example Spieksma *et al.*, 1989, Caramiello *et al.*, 1994). Models and forecasting have been more and more applied to aerosporological data in the last years in which long series data are at disposal and best models have been pointed out to predict the start of the pollen season and also the productivity of some cultivated plant (Frei, 1998).

Our study is based on the start of the pollen season of *Betula, Alnus, Platanus* and *Juglans*, considered as the day in which 5% of the sum of the annual pollen concentration is reached, and on the temperature data of the period preceding the pollen start.

Aerosporological data have been collected in the period 1983-2003 with a Hirst spore-trap located in the centre of the city, in the same site all along the 20 years.

Meteorological data have been collected in urban observatories and mean daily temperature calculated as (Tmin + Tmax)/2 have been considered.

Temperature sums calculated from the beginning of January and in the 30 days before start of the pollen season, daily mean temperatures and rainfall have been considered for each of the four taxa.

The variables were processed in several combinations until the best model for the start of season prediction was constructed.

The elevated winter temperatures are always followed by an earlier start of the pollen season in all the taxa but rainfall values are equally important in determining the start of pollination.

Results were compared with the ones obtained for *Betula* in the United Kingdom (Adams-Groom *et al.*, 2002) in Neuchatel (Clot, 2001) and in Denmark (Rasmussen, 2002).

ADAMS-GROOM, B., EMBERLIN, J., CORDEN, J., MILLINGTON, W. & MULLINS, J. 2002. Predicting the star of the birch pollen season at London, Derby and Cardiff, United Kingdom, using a multiple regression model, based on data from 1987 to 1997. **Aerobiologia** 18: 117-123.

CARAMIELLO, R., SINISCALCO, C., MERCALLI, L. & POTENZA, A. 1994. The relationship between airborne pollen grains and unusual weather conditions in Turin (Italy) in 1989, 1990 and 1991. **Grana** 33: 327-332.

CLOT, B. 2001. Airborne birch pollen in Neuchâtel (Switzerland): onset, peak and daily patterns. **Aerobiologia** 17: 25-29.

FREI T. 1998. The effects of climate change in Switzerland 1969-1996 on airborne pollen quantities from hazel, birch and grass. **Grana** 37: 172-179.

LEJOLY-GABRIEL, M. 1978. Recherches écologiques sur la pluie pollinique en Belgique. **Acta Geogr. Lovanien**. 13.

RASMUSSEN, A. 2002. The effects of climate change on the birch pollen season in Denmark. **Aerobiologia** 18: 253-265.

SPIEKSMA, F. TH. M., FRENGUELLI, G., NIKKELS, A.H., MINCIGRUCCI, G., SMITHUIS, I.O.M.I.J., BRICCHI, E., DANKAART, W. & ROMANO, B. 1989. Comparative study of airborne pollen concentrations in central Italy and the Netherlands (1982-1985). Emphasis on *Alnus*, Poaceae and *Artemisia*. **Grana** 28: 25-36.

Poster session d1

MOLECULAR AND CELLULAR ANALYSIS OF POLLEN ALLERGENS

Ole e 10, a major olive pollen allergen, is the first member of a new family of plant proteins

Barral, P.; Batanero, E.; Palomares, O.; Barderas, R.; Marazuela, E.; Salamanca, G.; Villalba, M. & Rodríguez, R.

Dpto. Bioquímica y Biología Molecular I, Facultad de Químicas, Universidad Complutense, Madrid, (Spain).

Type I allergy represents a major health problem affecting 25% of the population in industrialized countries. Isolation and characterization of the complete allergogram of an allergenic source is an important goal in the allergy research that contributes to understand the molecular bases of the disease and to improve diagnosis and therapy tools.

Olive pollen is one of the main causes of allergy in Mediterranean countries. Recently, a new allergen from this pollen, Ole e 10, has been isolated and characterized. It is a small (10.8 kDa) and acidic (pI 5.8) protein, which sensitizes 55% of patients allergic to olive pollen. Northern-blot experiments have demonstrated that Ole e 10 is not specific from pollen, so it is also presented in fruit, stem and leaves. Ole e 10 cloning has been performed in two PCR steps using total olive pollen cDNA as a template. The allergen consists in a single polypeptide chain with 102 amino acids, 6 cysteine residues and one consensus sequence of glycosylation. However, Ole e 10 staining with ConA lectin is negative, indicating the absence of mannose residues in its structure. Ole e 10 sequence shows homology with a family of genes from *Arabidopsis thaliana*, which would encode proteins comprised between 110 to 256 amino acids. The analysis of any protein product from these genes has not been reported so far, and its functional role is unknown. Hence, Ole e 10 would represent the first described and characterised member of a novel family of plant proteins. Ole e 10 also shows similarity with the C-terminal domain of 1,3-β-glucanases, such as the allergenic glucanase of olive pollen, Ole e 9. Finally, Ole e 10 aligns with the "Cys-box" domain of several families of glucanosyltransferases –Gas (glycophospholipid-anchored surface), Epd (essential for pseudohyphal development) and Phr (pH-regulated)- involved in yeast development.

Ole e 10 accounts for a new family of plant proteins that could perform, as an independent protein module, similar functions to those of homologous domains from glucosidases with catalytic role in carbohydrate metabolism.

Detection of *Parietaria judaica* allergenic proteins and comparison with *Urtica dioica*

Vega Maray, A. M.[1]; Fernández González, D.[1]; Valencia Barrera, R. M.[1] & Suárez Cervera, M.[2]

[1] Department of Plant Biology (Botany), University of León, Campus de Vegazana, 24071 – León, (Spain).
[2] Department of Botany, University of Barcelona, Avda. Joan XIII, 08028 – Barcelona, (Spain).

Loads of airborne pollen have been measured for many years in several countries to get information on daily quantities of allergenic pollen and their relations to symptoms of pollen allergy and to make forecasts of airborne pollen concentration in the air. Urticaceae family is a kind of plants which grows especially on soils rich in nitrogen, like overgrowing weeds in cultivations or abandoned lands near habited places. So, this is one of the allergenic family that appears in many pollen calendar (D´AMATO & col. 1991). Within this family there are two genera which are prominent significance in airborne pollen studies (*Parietaria* and *Urtica*) because these plants have great relevance as plants with allergenic pollen grains in diverse european regions, specially *Parietaria*.

Appllying a combination of transmission electron microscopy with immunocytochemical methods, the localization of the allergenic proteins in the *Parietaria judaica* and *Urtica dioica* mature and activated pollen