(SS27) Recent airborne allergenic pollen and spore research: phenological trends in different locations

Date: August 25
Place: Room 5234 (oral), Room 6310 (poster)
Organizers: Norio Sahashi, Jae-Won Oh, Carmen Galán & Teiji Kondo
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Purpose: 1. Clarify correlation with annual change and the seasonal variation of the allergenic pollen and spore, and the climate factors.
2. Compare the latest scattering tendency in the different location, and the characteristic scattering pattern by the area exists or not.
3. Explore the compatibility from comparison of the scattering pattern by the gravitational method and the volumetric one.
4. Verify correlation by hourly scattering pattern by automatic monitoring device and climate factor

Oral Presentation

Aug. 25 [AM1] Room: 5234

Chairs: Norio Sahashi, Hidetoyo Teranishi

9:00-9:40 **[Keynote] The HIALINE project: allergen release from pollen across Europe** SS27-O01 (59)

Jeroen Buters, Carmen Galán, Michel Thibaudon, Matt Smith, Rui Brandao, Celia Antunes, Roberto Albertini, Lukasz Grewling, Auli Rantio-Lehtimäki, Sevcan Celenk, Mikhail Sofiev, Ingrida Sauliene, Siegfried Jäger, Uwe Berger, Lorenzo Cecchi

Chair: Teiji Kondo

9:40-10:00 **Identification and quantification of allergenic pollen from Khairpu: Sindh -Pakistan** SS27-O02 (404)

Anjum Perveen, Shista Zeb

Chair: Carmen Galán

10:00-10:20 **Monitoring allergenic pollen in Japan—Comparison of Durham's and Burkard sampling** SS27-O03 (240)

Reiko Kishikawa, Akemi Saito, Hiroyuki Namba, Norio Sahashi, Yosimitsu Higaki, Eiko Kotoh, Teruhumi Shimoda, Kazuo Akiyama, Tomoaki Iwanaga

Aug. 25 [AM2] Room: 5234

Chair: Norio Sahashi

10:50-11:10 **Tree breeding coping with Japanese cedar pollinosis** SS27-O04 (248)

Teiji Kondo, Miyoko Tsubomura, Yoko Goto-Fukuda

11:10-11:30 **An environmental research study with a Burkard sampler in the area hit by the Great East- Japan Earthquake** SS27-O05 (364)

Hiroyuki Namba, Tsutomu Etani, Norio Sahashi

Chair: Hidetoyo Teranishi

11:30-11:50 **"Disaster Cough" caused by the mine dust after tsunami attack: Field research in Ishinomaki by Okayama Prefectural Medical Association** SS27-O06 (121)

Tsutomu Etani, Hiromitsu Okano, Kunihiro Fukushima, Hiroyuki Nanba, Norio Sahashi, Hideshige Takada, Satoru Suzuki

11:50-12:10 **Unusual scattering of cedar pollen by the continual earthquakes occurred in the Tohoku district Japan** SS27-O07 (441)

Norio Sahashi

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Jae-Won Oh, Dong-Hoon Han, Ha-Baik Lee, Im-Joo Kang, Seong-Won Kim, Kang-Seo Park, Myung-Hee Kook, Bong-Seong Kim, Kyu-Rang Kim, Young-Jin Choi

Chair: Teiji Kondo

14:50-15:10 **Effect of ground control difference on seasonal vegetation and aerobiology – A comparison of Japanese pear orchards and campus ground –** SS27-O09 (180)

Setsuo Hayashi, Hidetoyo Teranishi

Chair: Jae-Won Oh

15:10-15:30 **Seasonal incidence of airborne pollen and fungal spores in Nsukka zone, Nigeria** SS27-O10 (374)

Reginald Chukwuemeka Njokuocha

Poster Presentation

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13:30-14:30 **Pollen dispersion of *Cryptomeria japonica* and Cupressaceae in Ito shi (decadelong researches) No. 9** SS27-P01 (134)

Mayumi Fujii, Kenji Okazaki, Kiyoshi Makiyama, Kennichi Hisamatsu

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Athanasios Damialis, Charikleia Mezarli, John M. Halley

SS27-O01 (59)

The HIALINE project: allergen release from pollen across Europe

Jeroen Buters[1], Carmen Galán[2], Michel Thibaudon[3], Matt Smith[4], Rui Brandao[5], Celia Antunes[5], Roberto Albertini[6], Lukasz Grewling[7], Auli Rantio-Lehtimäki[8], Sevcan Celenk[9], Mikhail Sofiev[10], Ingrida Sauliene[11], Siegfried Jäger[12], Uwe Berger[12], Lorenzo Cecchi[13]

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Exposure to allergens is one of several factors determining sensitization and allergic symptoms in individuals. Exposure to aeroallergens from pollen is assessed by counting allergenic pollen in ambient air. However, proof is lacking that pollen count is representative for allergen exposure. A prior paper has shown that the same amount of pollen from different years, different trees and even different days released up to 10-fold different amounts of Bet v 1 in Munich, Germany. Thus exposure to allergen is poorly monitored by only monitoring pollen count. The main objective of the HIALINE-project has been to evaluate if these effects found in Munich are also measurable over Europe, and at the same time implement an outdoor allergen early warning network, in addition to the pollen forecasts. It has been also investigated whether meteorological factors that can govern allergen release from pollen, in an effort to predict the effect of climate change on the allergenicity of pollen. Airborne pollen and the major allergens from the top 3 airborne allergens in Europe (Phl p 5, Bet v 1 and Ole e 1) have been sampled across 9 European countries during 2009-11. Airborne

pollen has been measured by using a Hirst type volumetric spore trap. Aeroallergens have been collected with a ChemVol®2400 high-volume cascade impactor, being extracted and analyzed by allergen specific ELISA´s. Particulate matter (PM) in ambient air was fractioned into >PM10 (XL) and 10 µm > PM > 2.5 µm (M). Allergen forecast has been calculated by incorporating the SILAM chemical transport model and compared with the observations of HIALINE aiming at a comprehensive parameterization of the allergen release and transport. In general it has been observed similar profiles for airborne pollen and aeroallergens content in the air, being aeroallergens more associated to XL fraction stage. On the other hand, it has been detected allergenic activity out from pollen season, especially in the case of M stage. Smaller particles are more exposed to medium-long distant transport. Moreover, results have provides strong evidence that similar value of airborne pollen evokes different ambient air allergen loads in different geographical areas. Even more, when the same area is considered the allergen load of the pollen can vary within the season. Pollen differs in allergen release between European countries. Our study supports the importance of the aeroallergen quantification together with airborne pollen counts, in order to define the outdoor air allergenic load.

Keywords: airborne pollen, aeroallergens, particle size discrimination, air quality, modeling.

SS27-O02 (404)

Identification and quantification of allergenic pollen from Khairpu: Sindh -Pakistan

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An aerobiological survey was performed in the city of Khairpur, Sindh. This is the first study has been carried out by Burkard's Seven Day Recording Volumetric Spore Trap. During the present study period (Januray 2011- December 2011) a total of 4559 pollen/m^3 has been recorded. In this survey 42 pollen types have been recognized belonging to 33 plant families. These pollen types were distributed in 32 plants families were following Amaranthaceae, Anacardiaceae, Apiaceae, Asteraceae, Betulaceae, Boraginaceae, Brassicaceae, Caesalpiniaceae, Capparidaceae, Casuarinaceae, Chenopodiaceae, Combretaceae, Cupressaceae, Cyperaceae, Ephedraceae, Euphorbiaceae, *Hibiscus rosa-sinensis*, Meliaceae, Mimosaceae, Moraceae, Moringaceae, Myrataceae, Nyctaginaceae, Palmae, Papilionaceae, Pinaceae, Polygonaceae, Rhamnaceae, Rosaceae, Tamaricaceae, Typhaceae, Verbenaceae and Zygophyllaceae. Two season were recorded. One highest pollen concentration 880 pollen/m^3 was recorded in May-2011and Second highest peak value of 682 pollen/m^3 was observed in the month of September 2011. The lowest count was found in December, whilst the greatest pollen type's diversity was recorded in March. Maximum number of pollen types was recorded in March. A total of 29 pollen types have been recognized in this month. In the aerobiological survey of Khairpur the dominant pollen types recorded during study period in the atmosphere of Khairpur Poaceae such as *Cenchrus biflorus, Cenchrus ciliaris, Chloris barbata, Cynodon dactylon, Dactyloctenium scindicum, Dicanthium annulatum, Pennisetum glaucum and Zea mays* showed highest percentage 631 pollen/m^3. Second dominate pollen concentration was observed by Amaranthaceae/Chenopodiaceae with 474 pollen/m^3 followed by *Cyperus rotundus* 347 pollen/m^3, *Prosopis juliflora* 282 pollen/m^3, *Brassica campestris* 224 pollen/m^3, *Typha angustifolia* 223 pollen/m^3, *Eucalyptus culeate* 195 pollen/m^3, *Conocarpus erectus* 170 pollen/m^3, 125 pollen/m^3 and *Ricinus communis* 77 pollen/m^3. Poaceae and Amaranthaceae/Chenopodaceae, Mimosaceae and Myrtaceae are more allergenic pollen for Khairpur.

SS27-O03 (240)

Monitoring allergenic pollen in Japan—Comparison of Durham's and Burkard sampling

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Generally we have no concept of hay fever except some specialists before Japanese Cedar (JC) pollinosis exploded in Japan. Japanese government has begun to investigate the background and treatment on JC pollinosis. The gravitational method with Durham's sampler has been suitable to know huge number of JC and Cypress pollen grains as causative agent. Durham's sampler become the past method internationally, which indicated us not only many information on the conifer pollen but also important allergenic pollen in Japan. So we have to induce the volumetric method with Burkard sampler and compare the airborne pollen data with Durham's sampler against effect of global warming and climate change in the world. About 15 locations on airborne pollen monitoring by gravity method in Japan and we have continued to observe on the pollen at all seasons as the allergen. Recently we have begun to estimate atmospheric pollen concentration by Burkard sampler at some locations, international standard volumetric method, to check being compatible with pollen counting using Durham's sampler. In about twenty years we have counted huge number of JC and Cypress pollen occupied from 50 to 80 percent of all total pollen counts every year. The remarkable annual fluctuations of the conifer pollen count were observed and the numbers of patients with JC pollinosis have changed according with amount of pollen count relatively. Pollen count by Durham's sampler was very useful for treating and preventing for JC pollinosis in Japan. We found the conifer pollen count has significant correlation between Durham's and Burkard samplers. But grass pollen count, patients with grass pollinosis are less than Europe and USA, has not so strong significant correlation than conifer pollen, ragweed pollen count, too. To monitor airborne pollen Burkard sampler would be applied to Japanese aerobiology system to compare the important pollen data to the other countries against the climate change, devising count technique.

Keywords: Japanese Cedar and Cypress, JC pollinosis, gravitational method, Burkard sampler, climate change.

SS27-O04 (248)

Tree breeding coping with Japanese cedar pollinosis

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Although Japanese cedar, *Cryptomeria japonica*, is the most important forestry species in Japan, Japanese cedar pollinosis has become an object of public concern in Japan. It is one of the fundamental measure for this issue to decrease the number of airborne pollen. As there is wide interspecific variation concerning male flower bearing, we have developed 135 less pollen varieties.

Using their seeds around one million seedlings were cultivated and planted in the mountain. The male sterile variety was firstly reported in 1993. After surveying breeding stocks we have found two male sterile varieties. One variety was propagated by tissue culture or micro-cutting to maintain its male sterile character. To improve growth character crossing is in progress among the male sterile varieties and plus trees.

Keywords: less pollen, male sterile, *Cryptomeria japonica*, crossing.

SS27-O05 (364)

An environmental research study with a Burkard sampler in the area hit by the Great East-Japan Earthquake

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Much debris and sludge was left by the Great East- Japan Earthquake which took place on March 11, 2011. Immediately after the earthquake, there were and still are many patients with cough symptoms among the inhabitants and the volunteers who helped victims near the Minato Elementary School in Ishinomaki City, Miyagi Prefecture. Much sludge from the sea has accumulated there, followed by the dust from the sludge in the air. According to the measurements of the air pollutants such as SPM by the general atmospheric observatory center in Ishinomaki, there is no difference between the data before and after the earthquake. However the cause of the cough still remains unknown. It is important that we diagnose it, whether cough symptoms are from an infectious disease or caused by fine, dirty particles similar to mine dust or other allergic materials, in giving medical treatment. This time we assembled a medical care support team on behalf of the Okayama Medical Association. The purpose of this research is to clarify what is responsible for this disease through our environmental research with a Burkard sampler. As a result, an extremely large quantity of dust was observed. This dust was equal in quantity to that of yellow sand (abbreviation: Kosa) observed in Matsuyama University on the days when Kosa had been scattered. Whereas the particle diameter of Kosa was less than 10μm, the size of the dust was able to be confirmed as being more than 10μm as determined from the size of the Cupressaceae family pollen included in the dust. In the general atmospheric environment center, it is thought that the mine dust of more than 10μm has not been reflected as the air pollution materials. The dust, in which several kinds of spores of fungus or pollen were included, was regarded as the cause of the cough symptoms.

Keywords: Great East-Japan Earthquake, tsunami, Burkard sampler, dust, environmental research.

SS27-O06 (121)

“Disaster Cough” caused by the mine dust after tsunami attack: Field research in Ishinomaki by Okayama Prefectural Medical Association

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JMAT Okayama (Japan Medical Association Team) had supported in the areas affected by the Great East Japan Earthquake. In coordination with other rescue teams, we based at Minato elementary school (area 7) in Ishinomaki, Miyagi Prefecture. Not only in area 7, but also in 14 areas managed by the joint rescue team, corresponding to the symptoms of cough had became a major problem of respiratory disorders that may be caused by the mine dust after tsunami attack. Research team involved in the local health and the environment had engaged in Okayama Prefectural Medical Association in order to respond to the symptoms of cough. Field survey: JMAT Okayama 26th (June7-10, 2011). Clinical data analysis: set up a foreign aid station in the school. Assessment of phisical status was collected by questionnaire, blood samples of patients, and images of upper airway endoscopy. Atmospheric observation: microscopic analysis was performed at the level of dust collected in the air sampler. Observation of soil: dust and sludge samples at 15 point drop in the city, chemical composition analysis (PAHs, Linear alkylbenzene, Hopane, PCBs) and bacteriological analysis (total bacteria, Pseudomonas aeruginosa, Escherichia coli) were performed. Comparing data of AEROS, health and environmental assessment had been carried out. Mass distribution of N95 had been planned in 14 areas by the joint rescue team. Survey results could be provided to support joint rescue team. Symptoms of cough in the field went into the chronic phase after tsunami cannot be explained by a single infection, allergies, and chemical stimuli that were considered as a concept of Disaster Cough in the state's post-disaster tsunami. After distribution of N95, on the assessment data, the percentage of patient/cough has decreased sharply. (according to the health monitor of Ishinomaki area)

Keywords: symptoms of cough, Great East Japan Earthquake, reseach of the local health and envoronment, tsunami, mine dust.

SS27-O07 (441)

Unusual scattering of cedar pollen by the continual earthquakes occurred in the Tohoku district Japan

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The great earthquake which occurred on March 11, 2011 and following many large or small aftershocks took place all over the East-Japan, especially Tohoku district. On the other hand, in the Kanto district, the time when the great earthquake occurred overlap the scattering peak season of Japanese cedar pollen. For example, the hourly automatic pollen monitor (KH-3000) installed in the Tama area at Akiruno city (close to Japanese cedar forest) west of central Tokyo showed that one hour after the great earthquake occurred, the number of cedar pollen increased rapidly 7 times before the earthquake. However, at Funabashi city (far from Japanese cedar forest), one of the neighboring districts, far about 30km south of Tokyo, the highest peak was observed three hours later after the biggest earthquake. From the above-mentioned phenomena that the time lag of the peak number of cedar pollen and the unusual scattering change of Japanese cedar pollen by the biggest earthquake including some big aftershocks wants to make reference about any climate conditions during March

2011.

Keywords: earthquake, aftershock, Japanese cedar, automatic pollen monitor.

SS27-O08 (388)

The revised edition of Korean calendar for allergenic pollens

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Background: The old version of pollen calendar was used until this year in South Korea. That calendar did not reflect current pollen distribution and concentrations that can be influenced by changes in weather and environment. A new pollen calendar of allergenic pollens was made based on the data on pollen concentrations obtained in eight regions nationwide between 1997 and 2009 in South Korea. **Methods:** The distribution of pollen grains was assessed every day at 8 areas (Seoul, Guri, Busan, Daegu, Jeonju, Kwangju, Kangneung, and Jeju) nationwide for 12 years between July 1, 1997 and June 30, 2009. Pollen were collected by using Burkard 7-day sampler (Burkard manufacturing Co Ltd, Hertfordshire, UK), and the collected pollens were sent every week to Hanyang Guri Hospital. And then pollens were strained with Calberla's fuchsin staining solution and were identified and the number of pollen grains per m^3 was calculated. **Results:** Alder, birch and Japanese cedar started to appear in February. Japanese cedar showed a highest pollen concentration in Jeju. Pine became the highest pollen in May, and the pollen concentrations of oak and birch also became high. Common ragweed appeared in the middle of August and showed the highest pollen concentration in the middles of September. Japanese hop showed a high concentration between the middle of August and the end of September, and mugwort appeared in the middles of August and its concentration increased up until early September. Birch appeared earlier in Kangneung, and pine showed a higher pollen concentration than in the other areas. In Daegu, Oriental thuja, alder and juniper produced a large concentration of pollens. Pine produced a large concentration of pollens between the middle of April and the end of May. Weeds showed higher concentrations in September and mugwort appeared earlier than common ragweed. In Busan where is the southeast city, the time of flowering is relatively early, and alder and Oriental thuja appeared earliest among all areas. In Kwangju, Oriental thuja and hazelnut appeared in early February. In Jeju which is the end of southern island, Japanese cedar showed a higher pollen concentration than the other areas **Conclusions:** New information on pollen distributions and concentrations should be provided for the general publics or allergic patients through the website in order to prevent the occurrence of pollinosis.

SS27-O09 (180)

Effect of ground control difference on seasonal vegetation and aerobiology – A comparison of

Japanese pear orchards and campus ground –

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In order to lessen the impact of global warming, the wooded areas are becoming more important than ever, such as in farmland, university campus grounds. In Japanese orchards, artificial pollination and ground control on covered-grasses are usually performed in order to increase the fruit quality. The vegetation in the orchards is strongly affected by mechanical weeding and agricultural chemicals. Conversely, on the university campuses, ground control has been performed only on the several grasses by mechanical weeding. Among about the 15% students, recently the pollinosis symptoms have been reported in Japan. The adequate rainfall and warmness during the rainy season grow various summer grasses. To clarify the relation between the seasonal pollinosis and the environment conditions from early spring to late summer, we performed airborne pollen surveys on Japanese pear orchards and a university campus. At the same time, a questionnaire survey of was conducted among several farmers and students. From March to April, we found abundant pollen numbers of Japanese cedar and pine tree which had arrived from outside the orchard, when doing the airborne pollen survey. During the artificial pollination work in late April to May, we found a ten-fold higher pollen count of grasses such as annual bluegrass (*Poa annua* L., a major species in the undergrowth of orchards) in the ambient air where the farmers lived compared with the ordinary environment. At the same time, abundant pollen numbers of Japanese cedar and spores of *Lycopodium clavatum* (used to increase the volume of pear pollens) were found. During the pollination season pollinosis symptoms were found to be the most serious. In the early summer period from June to July, abundant allergenic molds (*Alternaria*, etc) and soil microorganism (nematode) were found in the ambient air environment of the orchard. Conversely, on the university campus, it was observed that several wild grasses and weeds flowered seasonally. Among students, around 15% of them complained of seasonal allergic symptoms.

Keyword: ground control, seasonal vegetation, pollens calendar, Japanese pear orchards, campus ground.

SS27-O10 (374)
Seasonal incidence of airborne pollen and fungal spores in Nsukka zone, Nigeria

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The composition and abundance of airborne pollen and fungal spores precipitating from the atmosphere of Nsukka zone, Nigeria, was studied in six locations from March 2005 to February 2006 using static gravimetric Tauber Trap. Of the pollen grains, an average of 56 (43-79) pollen types was recorded. The common and perennial types were Poaceae, *Alchornea cordifolia, Elaeis guineensis*, Asteraceae, Amaranthaceae-Chenopodiaceae and Moraceae among others. Grass pollen contributed the highest mean pollen concentration followed by trees and herbs. The highest incidence of pollen occurred during the late rainy season to early dry season (September – January). Spearman's non-parametric correlation test with meteorological parameters showed more negative and positive relationships with rainfall, relative humidity and temperature, light intensity, wind velocity respectively with the pollen types. 33 fungal spore types were identified and the major and

perennial fungal spore types include *Nigrospora, Endophragmiella, Ustilago, Curvularia, Pithomyces, Corynespora* and *Venturia*. Fungal spore abundance occurred more during periods of less persistent rainfall (June-July and October –December). Spearman's correlation analysis showed that no single meteorological parameter influenced spore concentrations. Different combinations of factors were responsible for the concentrations of the various fungal spore types. However, rainfall, relative humidity, temperature and light intensity seemed to be more critical meteorological factors.

SS27-P01 (134)

Pollen dispersion of *Cryptomeria japonica* and Cupressaceae in Ito shi (decadelong researches) No. 9

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For a period of about 10 years, ending in 2012, the authors investigated atmospheric pollen dispersion of Cryptomeria japonica and Cupressaceae in Ito shi. We expect this investigation useful in treating patients with pollen allergy. We set up a Durham sampler on a rooftop of the three－story building in Ito shi, Shizuoka and counted atmospheric pollen day by day. The results and the local weather conditions were treated statistically on the computer program Microsoft Excel. During the 10 years, in average, initial pollen was observed at January 3; pollen began to release was observed at February 6; final pollen was observed at May 12. The spring seasonal total pollen counts was 5683 grain/cm^2. This pollen counts and the previous early winter seasonal pollen counts were correlated statistically. The former was calculated about 280 times as many as latter. The pollen counts were related with the local weather conditions significantly. The investigations of the atmospheric pollen dispersion of *Cryptomeria japonica* and Cupressaceae and the weather conditions in the local area are useful to treat patients with the pollen allergy.

Keywords: *Cryptomeria japonica*, Cupressaceae, Ito City, meteorological factor, pollen dispersal.

SS27-P02 (179)

Management of the allergic-pollen in paddy field by ground-cover plants - An observation on the grows of a ground-cover plant "*Lippia canescens* Kunth" and a case study of using trial of the ground-cover plants by a local project -

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Moderate weed grows in paddy field contributes to protect the farmland, biodiversity and comfortable landscape. However, overgrown of weeds induces insect harm, airborne allergic pollen and desolated landscape. In a campus ground, we tried planting the cover plant "*Lippia canescens* Kunth" stems. 10 days after planting the stems of 10-15cm length, they grew well with roots in ground by a moderate watering condition. 20 days after, the plants grew out from the ground of the nursery. 27 days after, the ground-cover plants covered almost all the nursery and suppressed the weeds by trailing property. Recently, the ground-cover plants have been introduced to several paddy

fields against the overgrown of wild weeds. We studied on the growing state of a ground-cover plant "*Lippia canescens* Kunth". We visited cultivation experiment using such ground-cover plants by an local project at Oosima district, Imizu-City, Toyama. From the case study of using the ground-cover plants by a local project, it was found that the cover plants suppressed the weeds in the bank of paddy fields in three years after planting. It was concluded that the cover-plants contributed suppression of the weeds and preservation of the comfortable landscape.

Keywords: management of the allergic-pollen, paddy field, ground-cover plants, "*Lippia canescens* Kunth".

SS27-P03 (583)
Protein profiles of some common microfungi taxa isolated in atmospheric studies

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Air microbiology fascinated microbiologist since air contains hundreds of species of bacteria which may harm or affect living organisms directly or indirectly, and some non-living particles and fungi spores which may cause allergic reactions. Microfungi have a great importance due to either causing atopic allergic reactions or increasing infection risk for patients with a compromised immune system. It has been previously presented that most of these microfungi may cause allergic reactions in sensitive individuals. Therefore, determination of protein profiles of microfungi species is the first step in determining different allergens and allergen variations. The main aim of this study is to identify protein profiles of some microfungi taxa, which were commonly isolated in the atmospheric studies conducted in Turkey. The results of this study are important in developing a base for identifying new allergens from these microfungi taxa. In this study, taxa belonging to *Alternaria*, *Aspergillus*, *Cladosporium* and *Penicillium* were incubated in Malt Extract Broth at 25 ° C for 7 days. The inculated microfungi samples were filtered through Whatman filter paper and then the culture medium was removed by washing with distilled water. The filtrates were oven dried for one day and dried microfungi samples were ground by using liquid nitrogen. Proteins in the ground samples were extracted by further grinding in sand by using 0.2M PBS (pH=7.5) buffer. Raw extracts were transferred into test tubes and centrifuged at 15000g for 30 min. The total protein content in the supernatant was determined by Bradford method. Samples were loaded on a 12% SDS-PAGE and protein profiles were determined. As a result of the study, the proteins obtained from microfungi samples were identified as 9 kDa and 160 kDa for *Alternaria*; 11kDa and 103 kDa for *Aspergillus*; 9 kDa and 89 kDa for *Cladosporium*, and 10 kDa and 106 kDa for *Penicillium*. **Acknowledgement:** This study was financially supported by a grant from the Technical and Research Council of Turkey (TUBITAK-COST EUPOL, 109S265).

Keywords: *Aspergillus*, *Penicillium*, *Cladosporium*, *Alternaria*, protein profile.

SS27-P04 (66)
Atmospheric pollen calendar of Giresun, Turkey

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Background: Pollens are found in the atmosphere most of the year due to the difference in the pollination periods of plants. Knowledge of concentrations of airborne pollens is important for allergists, allergy patients, systematics, agriculture and forestry studies. **Method:** A 7-day recording Burkard volumetric pollen and spores trap was used for pollen sampling. The trap was placed on the 7 m high roof of the building in the centre of Kastamonu-Turkey. Pollens were trapped onto a melinex adhesive tape and sampled according to the standard preparation procedures. The daily concentration of pollens was identified using a light microscope at a magnification of x400 through scanning 12 transversal sections of the slide. The pollen counts were then converted to the amount of pollens in a cubic meter of air sampled per day. Then the concentrations of pollens were projected as weekly, monthly and annually. **Result:** Atmospheric pollen studies were carried out between June 2010-May 2012 in Giresun. 43 taxa were observed during the study. These taxa are; **Arboreal taxa;** Corylus, *Alnus*, *Betula*, Moraceae, Cupressaceae/Taxaceae, *Carpinus*, Pinaceae, *Castanea*, *Ostrya*, *Quercus*, Leguminosae, *Platanus*, *Populus*, *Ulmus*, *Fraxinus*, Rosaceae, *Junglans*, Oleaceae, *Acer*, *Fagus*, *Salix*, *Carex*, *Ailanthus*, Ericaceae, *Tilia*, *Laurus*, *Maclura*, *Sophora* and Rhamnaceae, **Nonarboreal taxa;** Chenopodiaceae/Amaranthaceae, Compositae, Umbellifeae, *Plantago*, *Artemisia*, *Rumex*, Urticaceae, *Gallium*, Cruciferae, Polygonaceae, *Narcissus*, Caryophyllaceae and Gramineae respectively. As a result of the study, it is identified that 90.99% of the total pollen concentration were the pollens of arboreal taxa, where 5.23 % were pollens of nonarboreal taxa and 3.77% for the Gramineae. **Conclusion:** During two year study, the highest pollen concentration was observed in February-March period while the lowest concentration observed in September-October period. Daily mean temperature total precipitation and daily mean humidity was observed most relating meteorological factor with pollen concentrations. **Acknowledge**: This study was financially supported by a grant from the Technical and Research Council of Turkey (TUBITAK-COST EUPOL, 109S265)

Keywords: pollen, pollen calendar, allergy, atmosphere, Giresun.

SS27-P05 (65)

One year aeropalynological analysis of atmospheric pollens in Çankırı, Turkey

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Background: Although pollens are seasonal allergens, they are found in the atmosphere most of the year due to the difference in the pollination periods of plants. Pollens are the main agents those cause asthma, rhinitis and allergy all over the world. Knowledge of concentrations of airborne pollens is especially important for allergists and allergy patients. **Method:** A 7-day recording Burkard volumetric pollen and spores trap was used for pollen sampling. The trap was placed on the 7 m high roof of the building in the centre of Kastamonu-Turkey. Pollens were trapped onto a melinex adhesive tape and sampled according to the standard preparation procedures. The daily concentration of pollens was identified using a light microscope at a magnification of x400 through scanning 12 transversal sections of the slide. The pollen counts were then converted to the amount of pollens in a

cubic meter of air sampled per day. Then the concentrations of pollens were projected as weekly, monthly and annually. **Result:** Atmospheric pollen studies were carried out between June 2010-May 2011 in Çankırı. A total of 19405 pollen/m^3 belonging to 45 taxa were observed during the study. These taxa are; **Arboreal taxa;** Pinaceae, Cupressaceae/Taxaceae, Moraceae, *Betula, Quercus, Junglans, Fraxinus, Populus, Ulmus, Sophora, Acer, Ailanthus, Carpinus, Salix,* Rosaceae, *Fagus, Aesculus*, Oleaceae, *Alnus, Vitis, Ostrya, Hedera, Corylus, Maclura*, Myritaceae and *Tilia*, **Nonarboreal taxa;** Chenopodiaceae/Amaranthaceae, *Plantago*, Compositae, *Artemisia, Platanus,* Leguminosae, *Rumex*, Umbellifeae, *Gallium, Carex*, Cruciferae, Labiatae, Centaureaceae, Boraginaceae, Caryophyllaceae, Urticaceae, Malvaceae, *Papaver*, and Gramineae respectively. As a result of the study, it is identified that 81.36% of the total pollen concentration were the pollens of arboreal taxa, where 8.91 % were pollens of nonarboreal taxa and 9.73% for the Gramineae. **Conclusion:** In study, the highest pollen concentration was observed in May while the lowest concentration observed in January. Increase of the mean temperature was the meteorological factor which raises the pollen concentration, where increase in total precipitation and mean humidity decreases the pollen concentration. **Acknowledge**: This study was financially supported by a grant from the Technical and Research Council of Turkey (TUBITAK-COST EUPOL, 109S265)

Keywords: pollen, allergy, atmosphere, Çankırı, Turkey.

SS27-P06 (158)

The genetic variation of Cry j 1, a major allergen of Japanese cedar pollen, among Japanese cedar plus trees

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Japanese cedar (*Cryptomeria japonica*, sugi) pollinosis is the most serious allergic disease in Japan. Since Cry j 1, the major allergn of *C. japonica* pollen, was isolated and characterized in 1983, allergen extract used for diagnostics and hyposensitization therapy has been standardized based on Cry j 1 concentration, which was determined by sandwich ELISA (Enzyme-Linked ImmunoSorbent Assay) using two monoclonal antibodies J1B01 and J1B07. Employing this ELISA system, the variation of Cry j 1 concentration in pollen among *C. japonica* plus tree clones (varieties) was investigated. Cry j 1 concentration in pollen differed approximately 10-fold among plus tree clones and this result indicated that selective use of less Cry j 1 clones could reduce *C. japonica* pollinosis. However, it was revealed that several clones produced Cry j 1 isoforms which had extremely low reactivity with either J1B01 or J1B07. This fact means that Cry j 1 concentration might be overestimated or underestimated by the sandwich ELISA using these monoclonal antibodies. For accurate measurement of Cry j 1 concentration, it is essential to develop new monoclonal antibodies which react with every isoform in the same manner. We explored SNP (Single Nucleotide Polymorphism)s in Cry j 1 gene using 267 *C. japonica* plus tree clones and found nine Cry j 1 isoforms. The frequency of each Cry j 1 isoform was also estimated by SNP analysis. Subsequently, we examined the reactivities between the Cry j 1 isoforms and newly developed monoclonal antibodies and selected the best combination of monoclonal antibodies for sandwich ELISA. We also report here the variation of Cry j 1 concentration in pollen among *C. japonica* plus tree clones which was estimated using the new Cry j 1 sandwich ELISA.

Keywords: *Cryptomeria japonica*, pollinosis, allergen, Cry j 1.

SS27-P07 (86)

Long-term trends in aeroallergen concentrations: more pollen grains but fewer fungal spores?

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The levels of airborne pollen have been increasing with pollen seasons occurring earlier and lasting longer. Previous research on changes in airborne pollen levels in Thessaloniki, Greece (conducted during 1987-2005) show exponentially increasing concentrations of pollen for a wide range of taxa. However, little has been reported for fungal spores, not only for Greece but also worldwide. These changes are also likely to have implications in public health: fungal spores are frequently implicated in respiratory allergy symptoms, sometimes as serious as acute respiratory failure. It is therefore very important to assess the potential risks associated with significant concentrations of spores in the atmosphere and also to maintain up to date data on pollen trends. A monitoring programme for airborne fungal spores and pollen has been in operation since 1987 in Thessaloniki. We analysed a dataset for the last decades to assess long-term patterns. We also tested for trends towards earlier, longer or more highly peaked pollen and spore seasons. This included a wide spectrum of taxa. The prevailing feature of these data is that the levels of pollen have been increasing, exponentially and with trends being more evident in the cases of woody plants; this is true for the majority of the taxa examined (11 out of 16) and for their aggregate, and also for their daily maximum concentrations (12 out of 16). On average, pollen concentration is at least doubling every decade. Among the taxa with the highest rate of long-term trend in pollen concentration, seven belong to woody plants (*Alnus*, *Carpinus*, Cupressaceae, Oleaceae, Pinaceae, *Platanus*, *Quercus*) and four to herbs (*Plantago*, Poaceae, *Rumex*, Urticaceae). For the pollen-season-related attributes there was no systematic tendency. Airborne fungal spores, on the contrary, show decreasing trends in their annual and maximum daily concentrations for the majority of taxa examined, but with significant alterations in fewer taxa, e.g. *Agrocybe*, *Botrytis*, *Cladosporium*, *Nigrospora*. For the spore-season-related attributes there was no systematic tendency; however, an overall decreased duration of the main spore season is evident. Our results suggest that changes in pollen and spore distributions are dominated by increases and decreases in pollen and spore production respectively rather than changes in phenology. The observed changes coincide with a rise in air temperature components. Given that this is the only meteorological factor to change significantly over this period in Thessaloniki it is possible that species showing strong trends might serve as bioindicators of climate change.

SS27-P08 (87)

Diurnal circulation patterns of airborne allergenic fungal spores in Thessaloniki, Greece: when is it safe?

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Airborne fungal spores are implicated in various respiratory allergy symptoms prevalent among children, with symptoms as serious as acute respiratory failure. As such health issues are widely known, seasonal and other long-term patterns have been well studied. However, very little information exists on the diurnal changes of fungal spore circulation, especially in Greece. The aim is to detect any existing diurnal circulation patterns of fungal spores so as to be able to predict any safe periods for allergic patients. A monitoring programme for airborne fungal spores has been in operation since 1987 in Thessaloniki. We analysed a dataset of hourly resolution in order to explore the quantitative and qualitative features of fungal-spore diurnal circulation. We investigated these daily patterns for a wide spectrum of taxa, all that contributed more than 0.1% to the total observed spore concentration. To control for differences due to methodology, we used two different methods of spore counting. The salient feature in these results is that in Thessaloniki fungal spores are detected in the air throughout the day. Overall, there is increased variability in airborne spore circulation, which is highly taxon-dependent. Frequently, no systematic circulation patterns were detected, as in the cases of *Pleospora*, *Stemphylium* and *Ustilago*. In cases when a pattern was observed, increased spore concentrations were usually found between midday and evening (12:00-20:00) as in *Alternaria*, *Cladosporiumin* and *Nigrospora* or at night until early morning (00:00-08:00) as in Ascospores, *Botrytis* and *Fusarium*. Our results suggest that airborne fungal spores are present in significant numbers throughout each day in the air of Thessaloniki. Any peak concentrations are either non-significant or strictly taxon-dependent. Contrary to the widely-held assumption that fungal spores are mainly found at midday, regardless of the taxon studied and when air temperature is higher, the current results reveal a different situation: either the absence of regular diurnal circulation patterns or taxon-dependent patterns with major peaks taking place at any time of day. This could be the outcome of weather particularities for this region and study period. For this reason, associations with meteorological variables, like rainfall and wind vectors, are likely to be important. We conclude that respiratory allergy symptoms due to airborne fungal spores may be manifested at any time of day, so that the high-risk period is not confined to the midday hours.

Keywords: aerobiology, aeromycology, biometeorology, climate change, daily variations.