

Airborne Pollen Grains of Rize

Rize İlinin Atmosferik Polenleri

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Abstract

Pollen grains were collected with a Durham sampler in the atmosphere of Rize from 1 January to 31 December 2000. During the observation period, a total of 4721 pollen grains/cm² belonging to 30 taxa, as well as unidentified pollen grains, were recorded. Total pollen grains consisted of 83.69% from arboreal plants, 14.38% from non-arboreal plants and 1.93% unidentified pollen grains. *Alnus* sp., Cupressaceae, *Castanea* sp., *Pinus* sp., *Populus* sp., *Fraxinus* sp., *Platanus* sp., *Corylus* sp., *Carpinus* sp., Gramineae and Urticaceae were found to be dominant pollen types in the atmosphere of Rize. The highest level of pollen fall was observed in February.

Keywords : Rize, Pollen, Pollen calendar

Introduction

Pollen grains cause some respiratory system diseases such as allergic asthma and pollinosis.

These diseases appear mainly during the flowering periods of plants. Determinations of type and falls of pollen grains are helpful for patients suffering from allergic diseases. For this reason, researches throughout the world have studied the dispersal of airborne pollen grains (Aytuğ, 1973; Nilsson and Palmberg-Gothard, 1982; Bousquet *et al.*, 1984; Spieksma *et al.*, 1989; D'Amato and Spieksma, 1990; Spieksma, 1990; Inceoğlu *et al.*, 1994; Saverova and Polevova, 1996; Bicakci *et al.*, 1996; Bicakci *et al.*, 2000a; Bicakci *et al.*, 2000b; Bicakci *et al.*, 2000c). The aim of this study was to describe pollen grains and changes in pollen fall per cm² weekly, monthly and annually. The results of this study are expected to be useful for allergists in establishing a correct diagnosis.

Materials and Methods

Rize extends between 40° 21' and 41° 25' E and 40° 33' and 41° 20' N in north-eastern part of Turkey. It has the highest annual rainfall in Turkey- more than 2300 mm. 48% of the land of Rize is forest and shrubbery, 24% meadowy and pasture and 21% planted fields. The plant, hazelnut and fruit orchards (pears, apples, tangerines) are grown on a high proportion of the agricultural lands. The vegetation in the forest area consists of *Carpinus orientalis* Miller., *C.betulus* L., *Castanea sativa* Miller., *Alnus glutinosa* (L.) Baertn. subsp. *barbata* (C.A.Mey.) Yalt., *Fagus orientalis* Lipsky., *Quercus petraea* (Mattusehka) Liebl., *Picea orientalis* (L.) Link., *Pinus sylvestris* L., *Erica arborea* L..

In this study, the gravimetric method and a Durham sampler (Bicakci *et al.*, 1996; Anderson, 1984; Hansen, 1987) were used. The Durham sampler was placed on the roof of the office building at a height of 15m above ground level. Slides placed on the Durham sampler were changed weekly.

Before exposure, the slides were covered with glycerine jelly mixed with basic fuchsin (Charpin and Surinyach, 1974). The slides were examined weekly under light microscope and the number of pollen grains found in the cover-glass area were converted to pollen counts.

Results and Discussion

A total of 4721 pollen grains from 30 taxa have been identified in the atmosphere of Rize from January 2000 to January 2001. Out of 30 taxa, 20 were arboreal while the others were non-arboreal plants. A total of 3951 pollen grains have been found to be arboreal (83.69%), 679 as non-arboreal (14.38%) and 91 as unidentified (1.93%) (Table). The arboreal pollen types were dominant due to the vegetation and geographical location of the town. According to other studies carried out in Europe, arboreal pollen types were also dominant in other regions for the same reason i.e. Burdur (Bicakci *et al.*, 2000a) Turkey (76.48 %), Ankara (Inceoğlu *et al.*, 1994), Ostrowiec Swietokrzyski (Kasprzyk, 1995), Poland (73%), Perugia (Romano *et al.*, 1988), Italy (71%), Isparta (Bicakci *et al.*, 2000c), Turkey (71%), Balikesir (Bicakci *et al.*, 2000b), Turkey (70.92%) Bursa (Bicakci *et al.*, 1996), Turkey (70.01%) and Ascoli Piceno (Romano *et al.*, 1988), Italy (55%).

The main pollen producers in the atmosphere of Rize were found to be the following arboreal plants: *Alnus* sp. (35.18%), Cupressaceae (13.56%), *Castanea* sp. (9.49%), *Pinus* sp. (7.16%), *Populus* sp. (3.43%), *Fraxinus* sp. (3.26%), *Platanus* sp. (2.14%), *Corylus* sp. (1.72%), *Carpinus* sp. (1.50%). They form 77.44% of total pollen concentration. The herbaceous plants such as Gramineae (8.43%) and Urticaceae (1.84%) were found frequently in the atmosphere of Rize making up 10.27% of the total (Table).

The types of pollens present in the atmosphere of Rize are shown in the form of a pollen calendar in the figure, based on the counts made in 2000. The following taxa produced the greatest amounts of pollens in the atmosphere of Rize:

Alnus sp.: The pollen season began in the first week of January (1st week of the year) and ended in the last week of December (52nd week). The highest values were noted in the second week of February (6th week).

Corylus sp.: Pollen production continued from the first week of January to the last week of December. The highest counts were recorded in the second week of February.

Fraxinus sp.: The pollen season started in the first week of January and ended in the last week of March (13rd week). The highest values were noted in the third week of March (11st week).

Cupressaceae: The pollen season was long as starting in the first week of January and ending in the last week of June (26th week). The peak value was noted in the fourth week of March (12nd week).

Populus sp.: Pollen production continued from the fourth week of March to the second week of May (19th week). The highest counts were recorded in the last week of March.

Carpinus sp.: The pollen season was relatively short (7 weeks). It started in the fourth week of March and ended in the first week of May (18th week). The highest counts were recorded in the last week of March.

Gramineae: Pollen grains were recorded during the greater part of the year, from March to September. The highest values were noted in the first week of July (27th week).

Platanus sp.: The pollen season was relatively short (6 weeks). It started in the last week of March and ended in the first week of May. The peak value was noted in the first week of April (14th week).

Pinus sp.: Pollen production was continued from the first week of April to the first week of July. The highest counts were recorded in the second week of June (24th week).

Urticaceae: The pollen season began in the last week of May (22nd week) and ended in the fourth week of August (34th week). The peak value was noted in the last week of June (26th week).

Castanea sp.: The pollen season was relatively short (6 weeks). It started in the first week of June (23rd week) and ended in the second week of July (28th week). The peak value was noted in the third week of June (25th week).

Of the arboreal pollen grains *Alnus* sp., Cupressaceae, *Castanea* sp., *Pinus* sp., *Populus* sp., *Fraxinus* sp., *Platanus* sp., *Corylus* sp., *Carpinus* sp. and of the non-arboreal pollen grains Gramineae and Urticaceae were recorded at such high concentrations that must be considered as the most important allergic pollen grains (Bousquet *et al.*, 1984; D'Amato and Spiekma, 1990; Spiekma, 1990; Eriksson *et al.*, 1984; Koivikko *et al.*, 1986) in the atmosphere of Rize.

In conclusion, we established the airborne pollen calendar for Rize (Fig.) in order to determine the number of pollen grains causing allergenic diseases in the area and enable the physicians to help people suffering from these diseases.

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Özet:

Rize atmosferinde polenler 1 Ocak - 31 Aralık 2000 tarihleri arasındaki bir yıllık sürede Durham cihazı ile toplanmıştır. Çalışma süresi boyunca, cm² de 30 takson ve tanımlanamayanlara ait toplam 4721 adet polen tespit edilmiştir. Toplam polen miktarının %83.69'u odunsu, %14.38'i otsu bitkilere ve %1.93'ü ise tanımlanamayanlara aittir. Rize atmosferinde *Alnus* sp., Cupressaceae, *Castanea* sp., *Pinus* sp., *Populus* sp., *Fraxinus* sp., *Platanus* sp., *Corylus* sp., *Carpinus* sp., Gramineae ve Urticaceae taksonlarına ait polenler dominant olarak bulunmuştur. En fazla polene Şubat ayında rastlanmıştır.

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