

Herbaceous pollen and the allergens in the autumn of Saitama

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【Introduction】

Pollinosis is the worldwide public health problem caused by pollen allergen, since the allergen particles are released from pollen grains when transported in the atmosphere. Autumn pollinosis developed by herbaceous pollen such as *Asteraceae* family is affected as one of the autumn allergens recently in Japan. However, the information about airborne autumn pollen and its allergenic levels have not been supplied either. Therefore, purpose of this study is to determine the airborne pollen counts and allergenic concentrations during the autumn of Saitama, Japan.

【Experimental methods】

The pollen grains samples were collected by a Burkard pollen sampler from September 1st to October 17th, 2016. Pollen grains were impacted on transparent plastic tape coated with petroleum jelly and supported on a clockwork-driven drum. The sampler air flow was 10 L/min. The drum rotated at 2 mm/hour (one cycle about 7 days). The pollen grains are observed with pollen straining. During the same periods, an Andersen high-volume air sampler (AHV) was used to collect the suspended particulate matter containing allergen particles at five size-segregated stages such as: <1.1 μm, 1.1~2.0 μm, 2.0~3.3 μm, 3.3~7.0 μm and >7.0 μm. The AHV sampler air flow was 566 L/min. Airborne particles were collected on the quartz fiber filters. And then the filters were wrapped in aluminum foil and frozen at -45°C in a tightly covered bag. The suitable AHV filters were extracted by the extracting buffer. and then the allergenic concentrations were analyzed by a Biacore J system based on a surface plasmon resonance (SPR) method using the analytical curve with the standard solution of short ragweed pollen allergen Amb a1.

【Results and discussions】

The airborne autumn pollen counts determined by the Burkard method were shown in **Fig. 1**. The peak pollen counts were 312 pollen grains/m³ on September 1st, 2016. *Ambrosia* short ragweed, Giant ragweed, Mugwort, *Humulus*, grass species were observed from the pollen grains samples. The pollen allergenic size distribution and the average concentrations were shown in **Fig. 2**. The highest allergenic concentrations about 4.6 ng/m³ was even observed in fine particle sizes below 1.1 μm. From these results, it is considerable that *Ambrosia* genus pollen release the daughter allergenic particles in the urban atmosphere and have the strong cross-allergenicity. Furthermore, these fine allergenic particles may easily cause allergenic asthma, which is possible to cause giant ragweed pollinosis for the citizen living in Saitama City. For these reasons, it is important to clarify the airborne behavior of autumn herbaceous allergenic particles in the urban atmosphere in Japan.

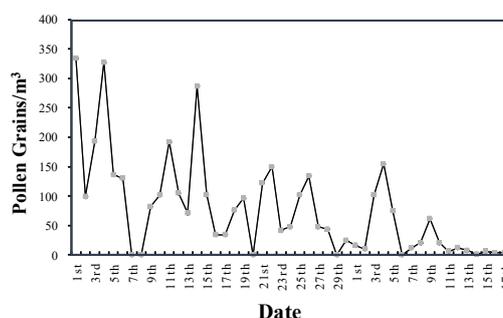


Figure 1. Airborne pollen counts of autumn collected by Burkard from Sep.1st to Oct.17th, 2016, Saitama City.

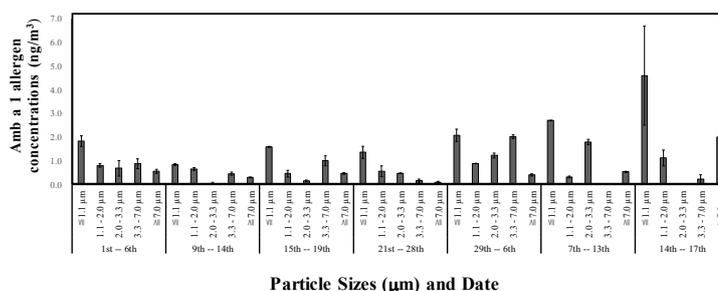


Figure 2. Size distribution of airborne pollen allergics (B) from Sep.1st to Oct.17th, 2016, Saitama City.