

## THE ALLERGENIC POLLEN IN THE ATMOSPHERE OF EL-HADJAR CITY (ANNABA, ALGERIA)

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**ABSTRACT.** The aeropalynological study of the atmosphere of El-Hadjar town was carried out during one year, from June 1, 2012 to May 31, 2013. The collected pollen during the sampling period yielded 2729 pollen grains/cm<sup>2</sup> belonging to 50 taxa, distributed on 20 families (*Apiaceae*, *Arecaceae*, *Asteraceae*, *Boraginaceae*, *Brassicaceae*, *Caryophyllaceae*, *Chenopodiaceae/Amaranthaceae*, *Cupressaceae*, *Cyperaceae*, *Ericaceae*, *Fabaceae*, *Lamiaceae*, *Mimosaceae*, *Pinaceae*, *Poaceae*, *Rosaceae*, *Scrophulariaceae*, *Ulmaceae*, *Urticaceae* and *Vitaceae*.); 24 genera (*Alnus*, *Artemisia*, *Betula*, *Borago*, *Carya*, *Casuarina*, *Echium*, *Ephedra*, *Eucalyptus*, *Fraxinus*, *Juglans*, *Juncus*, *Ligustrum*, *Mercurialis*, *Melia*, *Pistacia*, *Plantago*, *Platanus*, *Populus*, *Quercus*, *Rumex*, *Salix*, *Tilia* and *Trifolium*.) and, 6 species (*Castanea sativa*, *Corylus avellana*, *Olea europaea*, *Quercus ilex*, *Ricinus communis* and *Typha angustifolia*). The pollen peak concentration was recorded in April with 715 GP/cm<sup>2</sup> and the minimum value in October with 36.08 GP/cm<sup>2</sup>. The pollen spectrum has a percentage of 52.31% of pollen tree. The *Cupressaceae* family contributed with 12.84%, *Olea europaea* with 6.95%, *Eucalyptus* and *Casuarina* with 5.85 and 5.71%. The highest percentage of this type of pollen occurs in November with 90.51%, dominated by *Casuarina* pollen with 86.31%. The highest concentrations of tree taxa are: *Eucalyptus* (35.03%) and *Ligustrum* (16.21%) in June. *Fraxinus* with 64.64% in December, *Ericaceae* 17.42% in March; *Olea europaea* and *Quercus* in April with 18.86% and 6.79% respectively. The pollens of the herbs present 44.89%. They are characterized by the major presence of *Poaceae* and *Mercurialis* pollen with the following percentages: 21.49% and 11.75%. It seems that the months of July (86.33%) and August (80.14%) mark the highest percentages of non-tree pollen.

### 1. INTRODUCTION

According to the classification of the World Health Organization (WHO), allergic diseases are the fourth most common chronic disease. They constitute a public health problem and cause significant morbidity in different countries. Epidemiological studies have shown that the prevalence of allergic diseases and pollen allergy rhinitis is increasing. In the Mediterranean region, pollen-induced allergic reactions affect more than 10% of the population [1-4]. This work aims to identify allergenic pollen taxa in the atmosphere of El-Hadjar town.

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## 2. MATERIALS AND METHODS

### 2.1 Study area

El-Hadjar city is located on the Mediterranean coast at an altitude of 3 m above sea level, covering an area of 63 km<sup>2</sup> of Annaba province (northeast Algeria) (Fig. 1). It is the fourth most populous town in the Wilaya with 37.364 inhabitants [5].

This town exhibits a typical Mediterranean climate; the vegetation of the area is characterized by the presence of various plants including: *Poaceae*, *Salicaceae*, *Oleaceae*, *Fagaceae*, *Urticaceae*, *Fabaceae*, *Plantaginaceae*, *Polygonaceae*, *Chenopodiaceae/Amaranthaceae*, *Pinaceae*, *Cupressaceae*, *Asteraceae*, and *Arecaceae* [6].

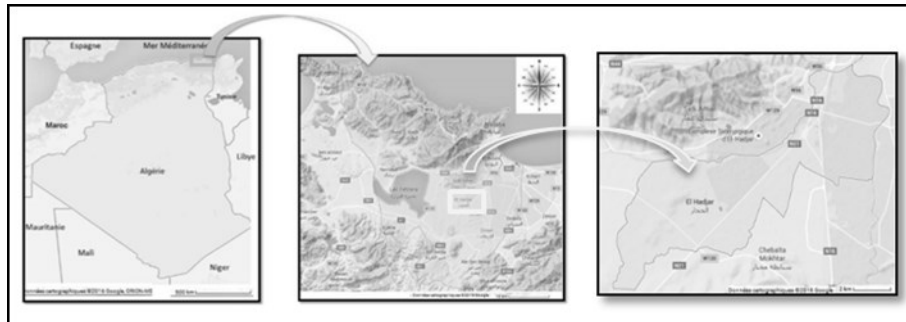


FIGURE 1. Localization of the study area.

### 2.2 Method of airborne collection

A gravimetric study of the atmosphere was carried out during one year from June 2012 to May 2013, using the Durham apparatus [7] placed in the town center at 4.5 m.

The slides were covered with glycerin jelly mixed with basic fuchsin [8]. After 24 h of exposure, slides were changed for reading with a light microscopy (Carl Zeiss, standard 20) using 40x and 100x magnification.

The pollen grains were identified and counted, identifying at specie, at genus and at family level using pollen Atlas of Reille [9]. The grains that were not identified were considered unidentified types.

### 3. RESULTS AND DISCUSSION

The collected pollen during the sampling period yielded 2729 pollen grains/cm<sup>2</sup> belonging to 50 taxa, distributed on 20 families (*Apiaceae*, *Arecaceae*, *Asteraceae*, *Boraginaceae*, *Brassicaceae*, *Caryophyllaceae*, *Chenopodiaceae/Amaranthaceae*, *Cupressaceae*, *Cyperaceae*, *Ericaceae*, *Fabaceae*, *Lamiaceae*, *Mimosaceae*, *Pinaceae*, *Poaceae*, *Rosaceae*, *Scrophulariaceae*, *Ulmaceae*, *Urticaceae* and *Vitaceae.*); 24 genera (*Alnus*, *Artemisia*, *Betula*, *Borago*, *Carya*, *Casuarina*, *Echium*, *Ephedra*, *Eucalyptus*, *Fraxinus*, *Juglans*, *Juncus*, *Ligustrum*, *Mercurialis*, *Melia*, *Pistacia*, *Plantago*, *Platanus*, *Populus*, *Quercus*, *Rumex*, *Salix*, *Tilia* and *Trifolium.*) and, 6 species (*Castanea sativa*, *Corylus avellana*, *Olea europaea*, *Quercus ilex*, *Ricinus communis* and *Typha angustifolia*).

The Figure 2 indicates that the pollen concentration peak was recorded in April with 715 GP/cm<sup>2</sup> and the lowest value in October with 36.08 GP/cm<sup>2</sup>.

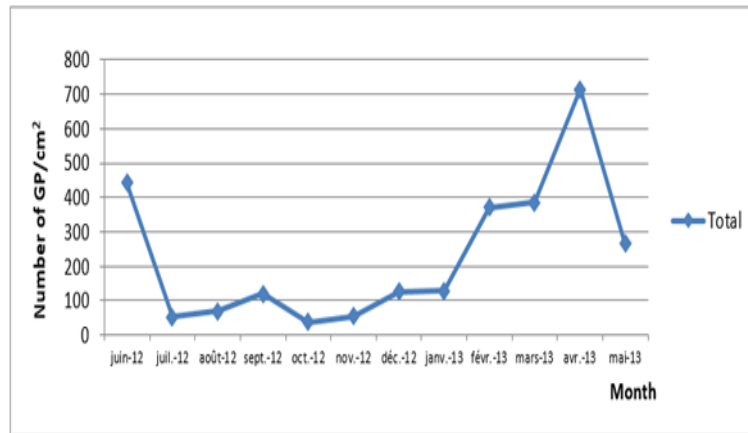


FIGURE 2. Monthly variation of the number of pollens collected during the season in El-Hadjar city (June 2012-May 2013).

At the beginning of the season, we observed a decline in the number of pollen followed by a small increase from July to September, then another decrease during the month of October.

The number of pollen grains began to increase gradually in November, then in January, we noted a significant rise from 126.5 to 370 GP/cm<sup>2</sup>. A second lift was recorded during the month of March ranging from 380 to 715 GP/cm<sup>2</sup>. Finally, a sudden fall takes place in May.

According to figure 3, the pollen spectrum shows a percentage of 52.31% of tree pollen.

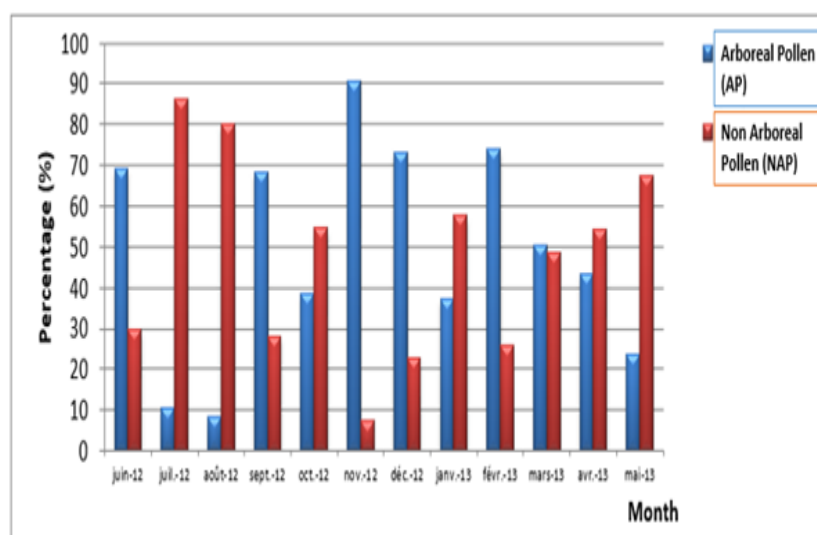


FIGURE 3. Monthly variation in the percentage of arboreal and non-arboreal pollen from collected taxa during the pollen season in El-Hadjar city (June 2012-May 2013).

The *Cupressaceae* family contributed with 12.84%, *Olea europaea* with 6.95%, *Eucalyptus* and *Casuarina* with 5.85 and 5.71%. The highest percentage of this type of pollen occurs in November with 90.51%, it is particularly pollens of *Casuarina* with 86.31%. The highest concentrations of tree taxa are: *Eucalyptus* (35.03%) and *Ligustrum* (16.21%) in June, *Fraxinus* with 64.64% in December, *Ericaceae* 17.42% in March; *Olea europaea* and *Quercus* in April with 18.86% and 6.79% respectively. The pollens of the herbs present 44.89%. They are characterized by the major presence of *Poaceae* and *Mercurialis* with the

following percentages: 21.49% and 11.75%. It seems that the months of July (86.33%) and August (80.14%) mark the highest percentages of non-tree pollen of *Poaceae*, *Cyperaceae*, *Mimosaceae*, *Urticaceae* and *Chenopodiaceae/Amaranthaceae*.

#### 4. CONCLUSION

During one year of aerobiological survey of the air of El-Hadjar town, data has shown that the principal allergenic collected taxa were: *Brassicaceae*, *Chenopodiaceae/Amaranthaceae*, *Cupressaceae*, *Mimosaceae*, *Pinaceae*, *Poaceae*, *Ulmaceae*, *Urticaceae*, *Alnus*, *Artemisia*, *Betula*, *Casuarina*, *Eucalyptus*, *Fraxinus*, *Ligustrum*, *Plantago*, *Platanus*, *Populus*, *Quercus*, *Rumex*, *Salix*, *Olea europaea* and, *Quercus ilex*. It may be a useful data for allergologists as an aid in establishing the exact diagnostics.

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