AIR BIOLOGICAL STUDY ON THE HAMAMELIDAE (AMENTIFERAE) POLLEN IN THE WEST PLAIN

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ABSTRACT
The amentiferes of our country’s flora are positioned by allergologists in the 5th and 6th group of plants with allergenic pollen. With the exception of Urticaceae, amentiferes are wooden plants.

Under the climatic conditions of the West Plain – Romania, amentiferes’ air-pollen is present in the atmosphere during February-September. The highest incidence, during the early spring – spring period (April 2001 and March 2002) had Betula pollen, and in the late summer – fall period (July 2001 and August 2002), Urtica pollen.

In 2002, blooming in amentiferes proceeded a week earlier and pollen annual quantity was 1.14 times higher than 2001.

KEY WORDS: Hamamelidae (Amentiferae), air-pollen, blooming phenophase

INTRODUCTION
Most of the allergens are exterior factors to organism and classify according to their entrance path in:
• Pneumo-allergens (pollen, atmospheric fungi, house dust of animal origin, birds, etc.);
• Food and digestive allergens (egg white, cow milk, strawberries);
• Insect allergens (insect venoms);
• Drug allergens;
• Chemical allergens (professional or not).

In some circumstances, pneumo-allergens may produce cutaneous or digestive allergic reactions, as the food allergens may be the cause of some respiratory allergic symptoms.

Pneumo-allergens cannot act on the human organism to produce antibodies and/or sensitized cells. For an allergic reaction to occur it is required the presence of a minimal quantity that must stay longer in the organism.

Even though pollen and spores exposures can be hardly avoided, prevention measures may be taken through access to current data regarding their air concentration, seasonal debut, pick-levels periods and season
length. This information is supplied by the local air-biological monitoring units, such as the unit from Timisoara.

Plants with allergenic pollen are divided by allergologists in wooden plants, grasses (Poaceae) and magnolioid grasses. Magnolioid grasses belong to the subclasses: Hamamelidae (Urticaceae family), Asteridae (Asteraceae, Plantaginaceae), Caryophyllidae (Chenopodiaceae, Amaranthaceae, Polygonaceae).

Anemophile wooden plants are part mainly of the Hamamelidae subclass (Platanaceae, Juglandaceae, Moraceae, Urticaceae, Fagaceae, Betulaceae and Corylaceae), Dileniidae (Salicaceae, Tiliaceae), Rosidae (Aceraceae) and Asteridae (Oleaceae) subclasses representatives are added. Pinophytes (Pinus, Taxaceae/Cupresaceae) are also anemophile.

MATERIALS AND METHODS
Determinations were carried out for the main amentiferes spread in the West Plain: *Alnus, Betula, Carpinus, Corylus, Juglans, Morus, Platanus, Quercus, Ulmus, Urtica*. Because the pollen sizes of these plants are relatively large, they cannot penetrate into the inferior respiratory ways, determining more of a rhino-conjunctive symptomatology.

Comparative volumetric observations were done between years 2001 and 2002, using the pollen collecting device VPPS Lanzoni 2000.

RESULTS AND DISCUSSIONS
Blooming phenophase debut was recorded for *Alnus, Corylus* and *Ulmus* genera in February during the two monitored years. In 2001, Taxaceae/Cupresaceae bloomed as well, and in 2002, *Acer, Populus* and *Salix* genera added. This debut occurred one week earlier than 2002 (11th of February).

In 2001, the quantitative peak for the amentiferes’ air-pollen was reached in April when *Betula* pollen had the highest incidence (24.4% of month’s total).

In 2002, pollen quantity produced by the amentiferes was higher in March, but representing only 30.03% of the total. Amentiferes prevailed in April: 72.81% of the total air-pollen.
FIGURE 1. Amentiferes pollen total quantity representation for 2001
February we recorded the following:

- 2001 constituted the blooming start for *Alnus*, *Corylus* and *Ulmus*;
• 2002 represented the increase of produced pollen quantity in the same plants (4.76 times for *Alnus*, 4.06 times for *Corylus* and 9.78 times for *Ulmus*) compared to the previous year;
• Total pollen quantity increased in 2002 with 687 PG.

**TABLE. 1.** Amentifères pollen expressed in percents of each month’s total

<table>
<thead>
<tr>
<th>Month</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2001</td>
<td>90.72%</td>
<td>36.08%</td>
<td>69.98%</td>
<td>55.3%</td>
<td>13%</td>
<td>18.61%</td>
<td>31.95%</td>
<td>10.95%</td>
</tr>
<tr>
<td>2002</td>
<td>68.92%</td>
<td>30.03%</td>
<td>72.81%</td>
<td>18.69%</td>
<td>24.32%</td>
<td>19.73%</td>
<td>18.71%</td>
<td>2.07%</td>
</tr>
</tbody>
</table>

In March we recorded the following:
• 2001 constituted the quantitative peak for *Alnus, Corylus, Ulmus* and debut for *Betula, Carpinus, Quercus*;
• 2002 represented the reduction of pollen quantity for *Alnus, Corylus, Ulmus* and the debut for *Quercus, Juglans, Platanus*. *Betula* and *Carpinus* had their quantitative peak in this month, with an increase of 3.95 times and 1.3 times, respectively, compared to the previous year;
Total pollen quantity increased in 2002 with 229 PG.
In April we recorded the following:
• 2001 constituted the quantitative peak for *Betula* and *Quercus*, decrease for *Carpinus* and blooming phenophase debut for *Juglans, Morus, Platanus*;
• 2002 represented the air-pollen quantity decrease for *Betula* and *Carpinus* and quantitative peak for *Juglans, Platanus* and *Quercus*. *Morus* enters suddenly the in pollination, this year’s quantity exceeding the previous year’s from the same period with 1.6;
• Amentifères air-pollen was produced in 2001 in a quantity higher with 330 PG compared to 2002.
In May we recorded the following:
• 2001 constituted the pollen quantity decrease for *Betula, Juglans, Platanus, Morus* peak and debut for *Urtica*;
• 2002 represented pollen quantity decrease for *Betula*, *Carpinus*, *Juglans*, *Morus*, *Platanus*, *Quercus* and debut for *Urtica*, the quantity being 4.02 times higher than that recorded in the same month of the previous year;

• Amentiferes air-pollen was produced in 2001 in a quantity higher with 138 PG compared to 2002.

In the June-September interval, *Urtica* was the only amentifere genus in bloom. In June, August and September 2002, *Urtica* produced more pollen than in the same month of the previous year. If the quantitative peak for 2001 was in June, in 2002 it was in August, being 279 PG higher.

Monitoring the blooming dynamics in Amentiferae, we may notice in the two studied years that there were two periods of quantitative peaks: one in the early spring – spring (April 2001 and March 2002) and one in the late summer – fall (July 2001 and August 2002).

It was proved that the *Betula* pollen is the most allergenic of all the pollen types produced by Amentiferae. For the monitoring unit from Timisoara, we noticed that in the early spring – spring season there is the highest pollen quantity. In 2001, April was the month with the maximal quantity, and for 2002, March. Blooming phenophase lasted in 2001 (13\(^{th}\) of March – 7\(^{th}\) of May) 56 days. The number of days exceeding the allergenicity threshold was eight. Blooming phenophase lasted in 2002 (5\(^{th}\) of March – 10\(^{th}\) of May) 11 days more and the allergenicity threshold was exceeded in 9 days.

![FIG.3. Pollen quantify of Amentiferae in February 2001-2002](image1)

![FIG.4. Pollen quantify of Amentiferae in March 2001-2002](image2)
FIG.5. Pollen quantify of Amentiferae in April 2001-2002

FIG.6. Pollen quantify of Amentiferae in May 2001-2002

FIG.7. Pollen quantify of Amentiferae in June-September 2001-2002

FIG.8. Quantify Amentiferae pollen evolution during flourishing period of the years 2001-2002
CONCLUSIONS

Under the climatic conditions present in the West Plain – Romania, amentiferes air-pollen is present in the atmosphere in the February-September interval. The anthesis start, as well as the maximal blooming period differs from one year to another.

- Blooming start occurred a week earlier in 2002.
- *Betula* pollen exceeded the sensitizing threshold in 8 and 9 days, respectively.
- In the two monitored years, there were two quantitative peaks: one in the early spring – spring season (April 2001 and March 2002) and one in the late summer – fall season (July 2001 and August 2002).
- Annual amentiferes pollen quantity was 1.14 higher in 2002.

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