

# **IMPACT OF OLIVE POLLENS IN ALLERGY AND ASTHMA IN JORDAN**

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Around 17 million olive trees are farmed in Jordan in about 107,000 hectares of land and the plantation in the last 20 years have grown by 220%.

*Olea europaea*, the Olive tree, is

A symbol of wisdom, peace, and victory.

It is also one of the most important causes of seasonal respiratory allergy in the Mediterranean area and also in other parts of the world where this tree is now grown.

Olive tree is a member of the Oleaceae family, which has 4 important genera: Olive (*Olea*), Ash (*Fraxinus*), Lilac (*Syringa*), and Privet (*Ligustrum*).

The Olive tree is an evergreen growing to 10 m, with a broad, round crown and a thick and knotty trunk.

Adaptation to different grounds

The flowers are hermaphrodite (have both male and female organs).

The plant is self-fertilizing.

Pollination is by insects but also by wind when pollen is in abundance.

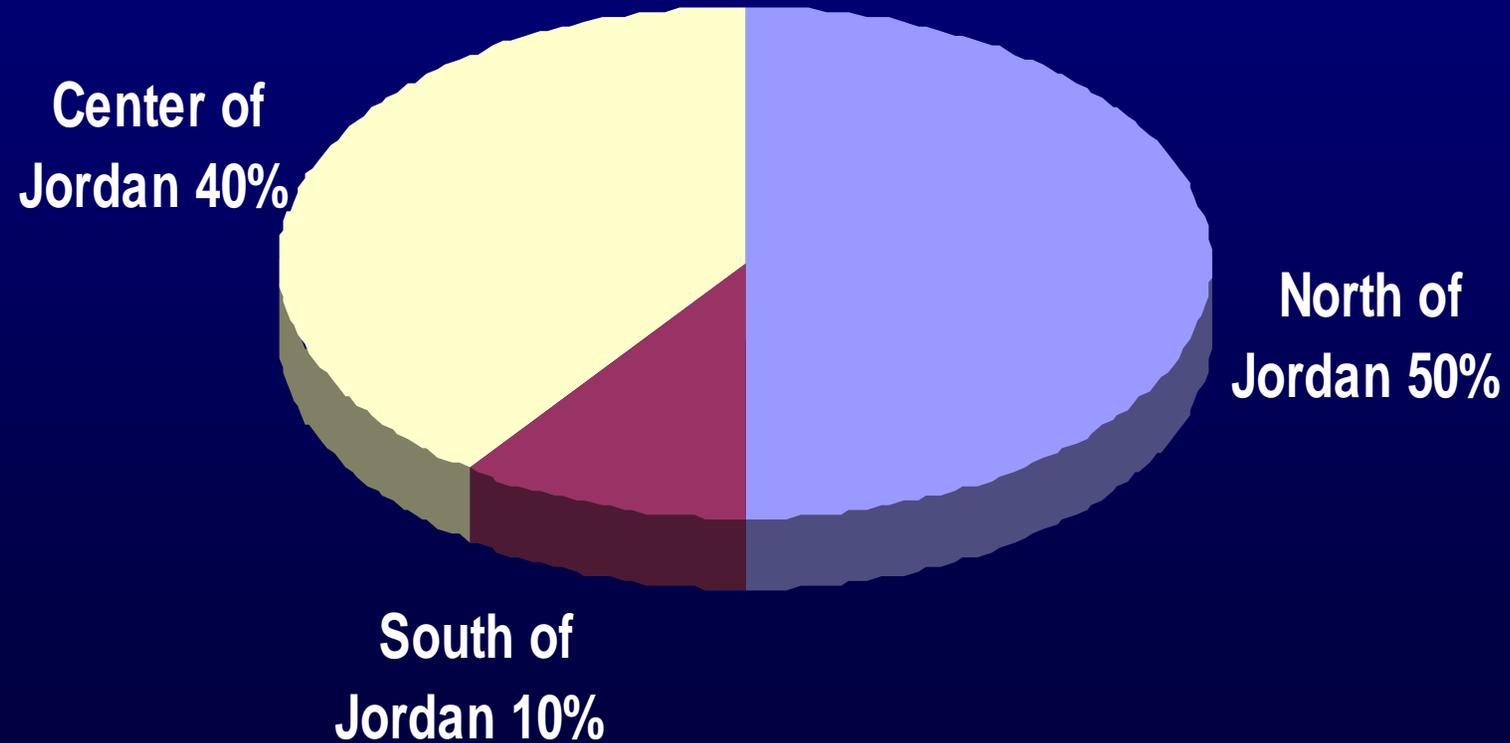
The pollination period varies: it typically occurs in the spring

The olive tree is a hardy, drought and disease resistant tree well suited for the harsh conditions of desert. Some trees are hundreds of years old. The olive tree produces a small, pale, white flower which is wind pollinated and produces volumes of airborne pollen in the spring. Olive tree pollen is one of the most potent and sensitizing of the allergenic plants. Because of its association with severe springtime allergy symptoms, the city's of Amman have banned the planting of fruiting Olive trees

# Allergy in Jordan

- Prevalence: 20 % --1,200,000 (out of 6,000,000)
- 33% of allergic pts.developed asthma
- Increase exposure to tobacco smoke.
- Children spend more time indoors.
- Adjuvant effect (air Pollution).
- Expanding of olive planting inside the cities.
- Westernization life style.
- Labor-saving machines.
- Deviation of immune response due to marked children infectious diseases.

# Allergy Distribution In Jordan



Olive pollens can induce asthma, allergic rhinitis and allergic conjunctivitis in sensitized persons-itchy eyes, runny nose, wheezing, coughing, and sneezing during the spring.

Olive pollen is also cross-reactive. If someone is exposed and sensitized to olive pollen they may react to other allergens such as ryegrass

Sensitization to Olive pollen has been reported in Jordan .mono and polysensitisation

Positive skin reactions to Olive pollen, among atopic patients of the Jordanian population, was shown to be high where Olive trees are abundant (70%),30% mono. and lower (60%) 20% Mono.where the trees are scarce).

55% of Monosensitised persons have symptoms during pollination season

The daily pollen concentration in the atmosphere showed pollen from the Olive tree to be one of the most common pollen grains

Olive is another highly allergenic pollen. Like walnut, it is heavy and is only important if it is close by, although some patients have trouble just driving by large stands of olive pollen on expressways and roads!

Olives start pollinating later in the spring than many other trees and grasses and cause a great deal of allergy symptoms

Positive skin reactions to Olive pollen, among atopic patients of our population, was high where Olive trees are abundant (70%), and lower (60%) where the trees are scarce.

## **Seasonal Triggers**

In the spring, the main triggers of seasonal allergies are pollen from trees like oak, elm, ash, maple,, alder, birch, and olive. From late spring through summer, triggers include Bermuda, timothy, sweet vernal, orchard and Johnson grass.

Ragweed pollen is the major culprit of allergies in the fall.

## Pollen count

| Range       | Low  | Medium   | High       | Very High |
|-------------|------|----------|------------|-----------|
| Olive Trees | <15  | 15-91    | 91-1500    | >1500     |
| Grasses     | <10  | 10-50    | 51-500     | >500      |
| Weeds       | <10  | 10-50    | 51-500     | >500      |
| Molds       | <900 | 900-2500 | 2501-25000 | >25000    |

Pollen from olive trees can exacerbate asthma and a range of other allergic conditions.

In the Mediterranean area including Jordan, olives are widely distributed and its pollen is one of the most important causes of respiratory allergy



## **Overview**

An estimated 10 percent of the world's population suffers from pollen allergies, causing days of missed school or work and poorer quality of life.

Different varieties of trees, grass and weeds pollinate at different seasons, so people with allergies to one or more types of pollen may experience symptoms for several months.

Pollen allergy is easy to identify but difficult to avoid, but there are ways one can reduce the symptoms

Many people who have olive allergies are also at risk for asthma., allergies trigger asthma symptoms or an asthma "attack." This "allergic asthma" is the most common form of asthma.

# SYMPTOMS:

- allergic rhinitis.
- asthma.
- chronic sinusitis.
- otitis media with effusion.
- allergic conjunctivitis.
- atopic dermatitis.
- oral allergy syndrome.

# Risk Factors for Asthma

- Allergy/Atopy
- Family history of asthma/allergy
- Perinatal exposure to tobacco smoke
- Early viral respiratory tract infections
- Low birth weight
- Environmental pollution
- Low socio-economic status
- Passive smoking

# Atopy and Asthma

- Atopy is associated with elevated total IgE
- Specific IgE against common aero-allergens
- Positive skin test to common aero-allergens
- Asthmatics are more atopic than non-asthmatics
- Atopy is more common in childhood asthma

total serum  
IgE IU/ml

10 000

1000

100

10

1

normal range

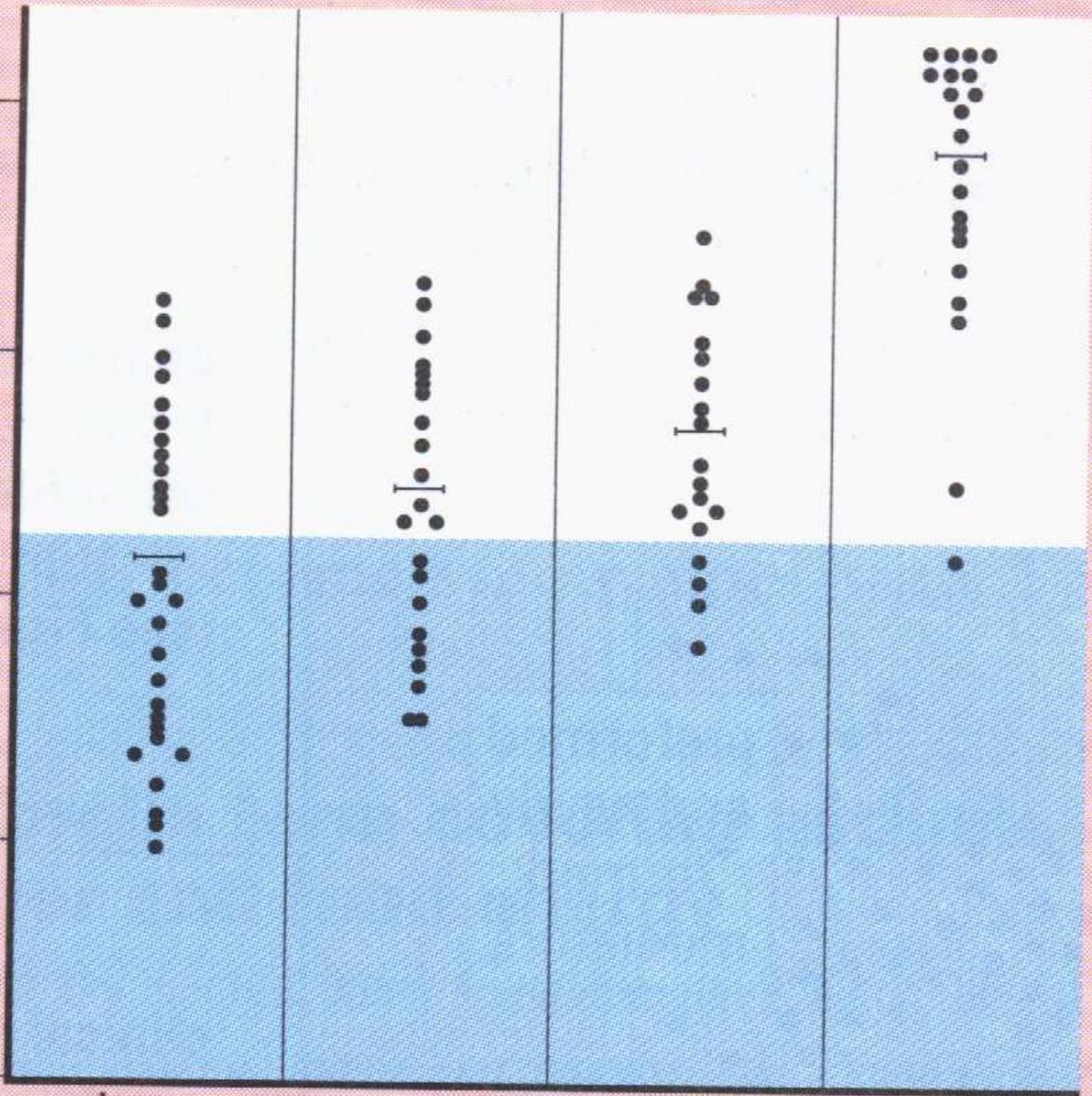
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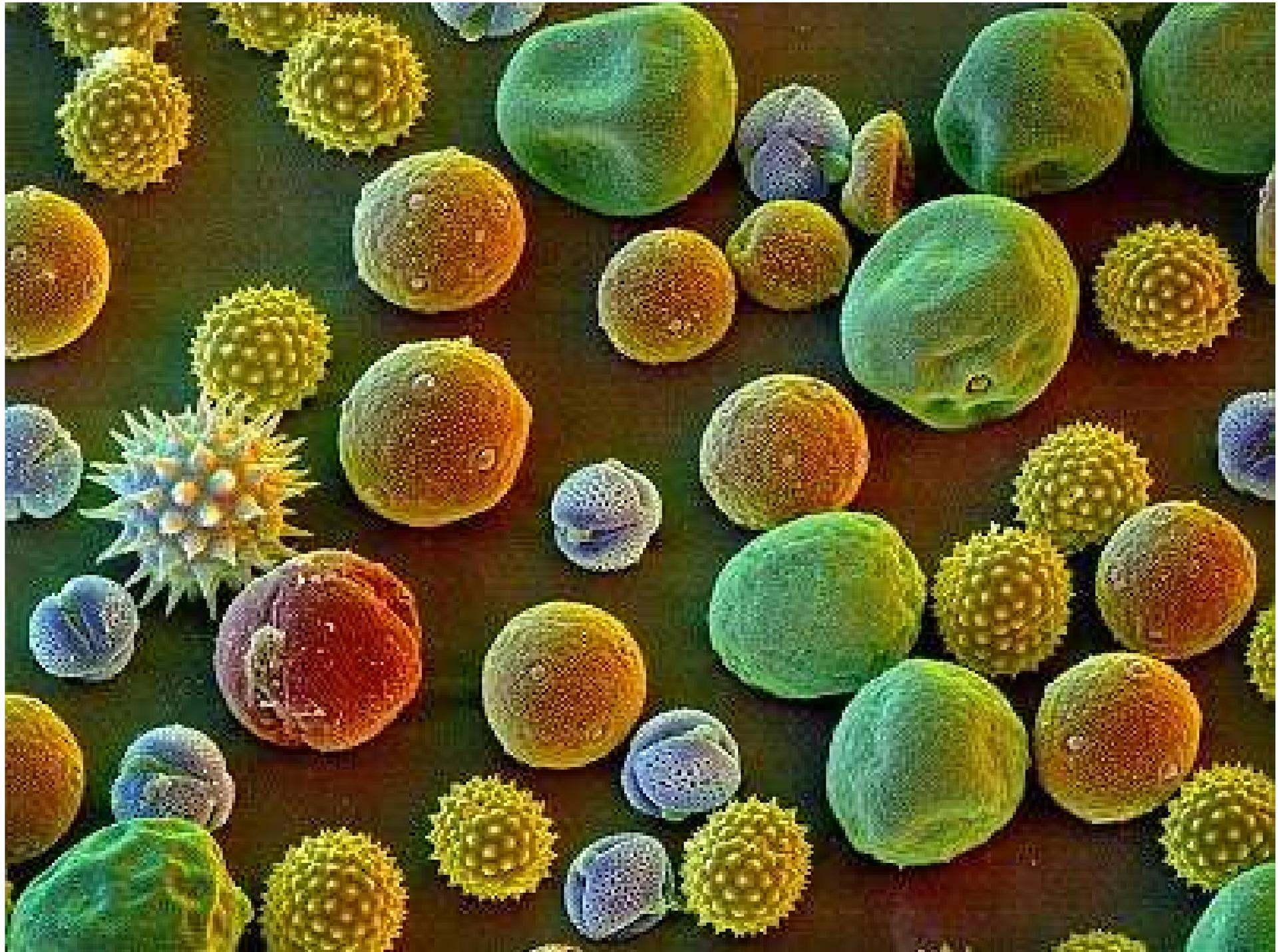
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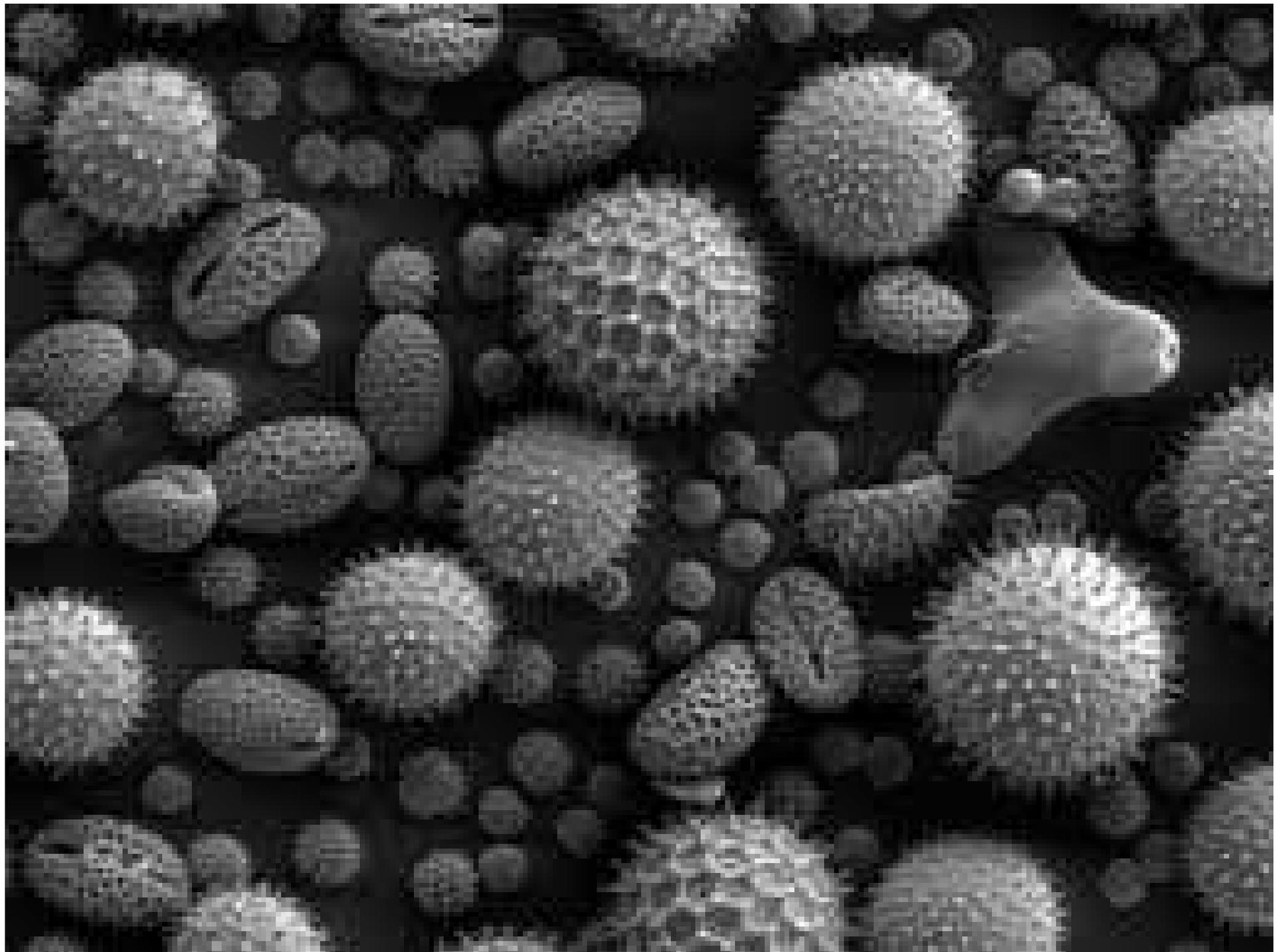
March

April, May, June

Olive Allergy











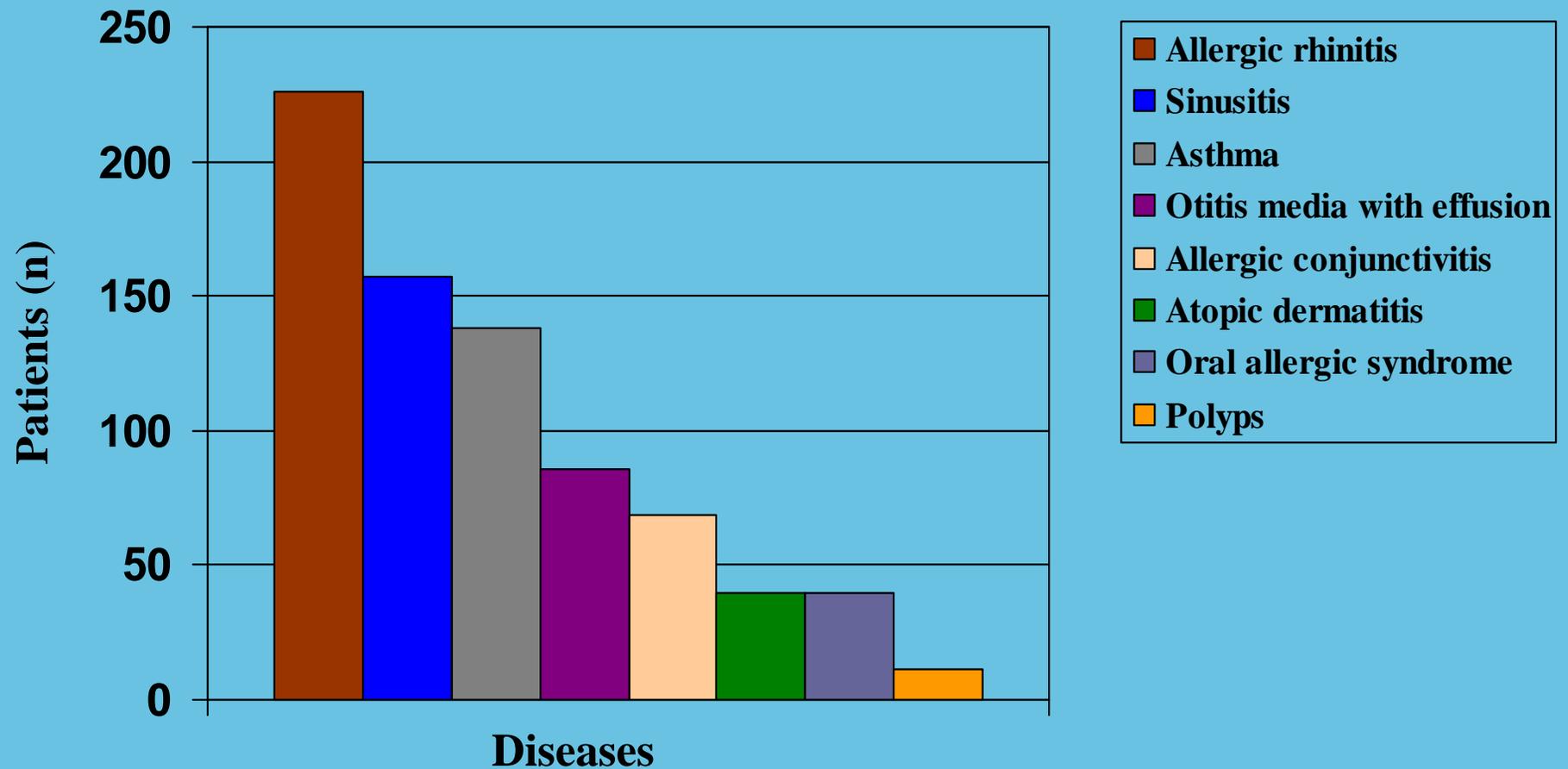
# **OLIVE Asthma Diagnosis**

- History and patterns of symptoms
- Physical examination
- Measurements of lung function
- Measurements of allergic status to identify risk factors

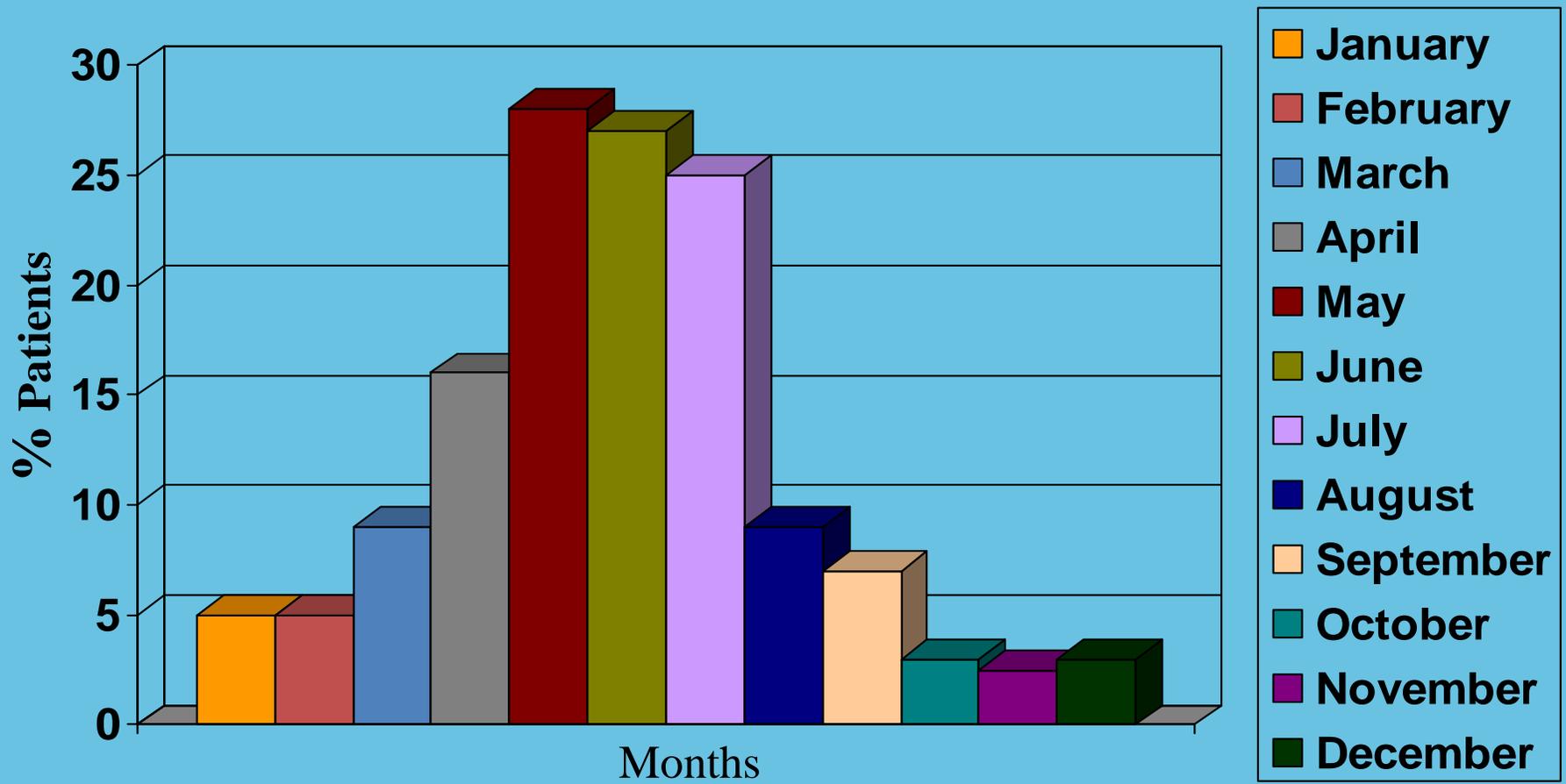
# Symptoms and Signs

- **Variety of symptoms**
  - wheeze
  - shortness of breath
  - chest tightness
  - cough
- **Asthma symptoms tend to be:**
  - Variable and intermittent
  - Worse at night
  - Provoked by triggers

# Clinical spectrum of sensitization to *Olea europaea*.



# Calendarization of positive skin prick test to *Olea europaea*.



# Asthma Management

There is no cure for asthma, appropriate management most often results in the achievement of control



A photograph of an olive grove. The trees are arranged in neat rows, and the ground is covered with dry, yellowish-brown leaves and twigs. In the background, a yellow sign is visible. The text is overlaid on the lower-left portion of the image.

Olive is another highly allergenic pollen. Like walnut, it is heavy and is only important if it is close by



The presence of at least 20 proteins with allergic activity has been demonstrated in olive pollen, and 10 of these have been characterized (Ole e 1 to Ole e 10).

- Ole e 1 is considered to be the major allergen (causing sensitization in more than 55% of patients).
- Markers of the major histocompatibility complex and other genetic loci associated with the allergic response have been analyzed using population-based, family-based, and functional approaches revealed the involvement of genetic regulation in this type of response.
- evaluation of environmental factors and their relationship with genetic factors is essential when attempting to understand this type of disease. exposure to high doses of olive pollen allergen in a specific genetic context can trigger different allergic conditions).

- An HLA class II DR3-DQ2 association with olive allergy was demonstrated
- Olives and olive oil may also cause allergic reactions that manifest in the form of dermatological or gastrointestinal symptoms. This strong association between DQ2 and anti-Ole e 1 IgE antibody response induces a high relative risk of allergy.
- Specific patterns of sensitization are regulated by different HLA class II antigens
- Childhood asthma may be related to vitamin D deficiency.

HLA class II genomic typing showed that phenotypic frequency was high for DQ2 and low for DR4 in Jordanian allergic patients who were sensitive to olive pollen, while in those who

were not sensitive to olive pollen, phenotypic typing was high for DR4 and low for DQ2.

It therefore appears that DR4 protect against sensitization to olive pollen, whereas DQ2 predisposes to it.

Patients who showed Ole e 10 IgE antibodies also had more severe bronchial asthma, because the number of asthma days was significantly higher than in non-Ole e 10-sensitized patients.

These data suggested that the existence of anti-Ole e 10 IgE in patients with *O europaea bronchial asthma* would make it possible to identify patients at risk of a more severe disease

The response to Ole e 2 and Ole e 10 was associated with DR7-DQ2 and DR2 (15), respectively

.

- *IL13* and *IL4RA* could be relevant markers for allergy to olive pollen and asthma development.
- Implication of 7 genetic polymorphisms described as asthma susceptibility genes: *IL13* (C–1112T and R130Q), *IL4RA* (I50V, Q551R), *IL5* (C–746T) and *ADRB2* (Q27E and R16G) in specific olive pollen allergic sensitization.

# Reduce Exposure to Risk Factors

- Reduce exposure to indoor allergens
- Avoid tobacco smoke
- Avoid vehicle emission
- Identify irritants in the workplace
- Explore role of infections on asthma development, especially in children and young infants

## Prevention/Solution

Some suggestions to keep pollen allergies under control from spring to fall:

- Keeping indoor air clean with dehumidifier and high-efficiency filter (HEPA) keeps pollen count low inside the house.
- Keeping the windows and doors closed during peak pollen season.
- Staying indoors during dry, windy days, and when the olive pollen count is high, that is, from 10 A.M. to 4 P.M.
- Wearing dust masks for outdoor activities also help reduce exposure to pollen.
- People with pollen allergy may also choose to delegate gardening, lawn mowing or other outdoor activities when pollen counts in the air are high.
- Change your clothes after coming from outside
- Wash your hair regularly to get rid of the pollen accumulated in the hair

## **Olive Allergy Treatment**

Antihistamines and nasal steroids can be used to relieve the symptoms of an olive tree pollen allergy. Decongestants or nasal irrigation can clear nasal congestion.

Some people benefit from immunotherapy or allergy shots, which involve giving injections of a small amount of the pollen allergen over a period of time. In some cases, the immune system becomes desensitized and the effects of the allergy may lessen.

# Treatment

- Inhaled glucocorticosteroids
- Leukotriene modifiers
- Anti-IgE
- Theophylline
- Systemic glucocorticosteroids
- Long-acting inhaled  $\beta_2$ -agonists

# Sublingual immunotherapy (SLIT)

Sublingual immunotherapy is a method of treating allergies by desensitizing individuals to allergens over time

(IgE)–mediated disease, with positive skin test results and RAST concordant with clinical symptoms.

Severity and duration of symptoms should warrant use of SLIT, with confirmation from objective parameters such as missing time from work or school. For rhino conjunctivitis, patients should have subjective symptoms of sufficient severity and duration. For asthma, the control questionnaire should not show uncontrolled asthma, and pulmonary function testing is required to exclude patients with severe asthma. Pulmonary function should be monitored during therapy.

- SLIT therapy should only be started in settings where standardized or high-quality vaccines are available.
- Although SLIT is administered at home, patients should be educated regarding possible risks and how to control adverse effects that may develop.
- Patients with a single allergen sensitivity are more likely to benefit from specific immunotherapy vs patients sensitive to multiple allergens.
- Specific immunotherapy will not benefit patients with nonallergic triggers.
- For safety reasons, asthmatic patients must be asymptomatic when receiving SLIT injections. Asthmatic patients with severe airways obstruction are more likely to have lethal adverse reactions.



# CONCLUSION 1:

- *Olea europea* is an important sensitizer in Jordan.
- Cross-reaction to other pollens belonging to Oleaceae family, could explain monosensitization to olive tree.
- Further studies are needed to evaluate the role of *Olea europea* in allergic diseases in our area

## CONCLUSION 2:

- Olive accounts for (1/3) of main causes of allergy.
- Total and specific IgE testing is recommended.
- Cross-reaction with pseudo-ole 10.
- Results should be evaluated with regarding to hx, clinical symptoms and signs.
- Olive pollinosis is uncommon in the form of monosensitization, and in these patients, symptoms are perennial rather than seasonal.
- Olive still cultured inside cities and on pavements
- Banning of the planting of fruiting Olive trees IN the cities

***Thank you***

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