

Pollen-related allergy in Italy

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Pollen-related allergies are very common in Italy and pollinosis is the commonest allergic disease. The type of allergenic plants and the prevalence of hay fever varies among regions. In the Mediterranean area there are characteristic climatic conditions (mildness of winter, summer dryness) that facilitate the growth of a typical vegetation with its associated various types of allergenic pollen grains, some of them very different from those of central and northern Europe. Italy has a central position in the Mediterranean basin, but because of its geographic characteristics, there are different climatic aspects with different vegetation between northern, central, and southern areas. Gramineae are the most common allergenic plants in northern and central Italy, where more than 60% of patients with pollinosis are grass-pollen sensitive. Parietaria is the most important pollinating plant in southern Italy and Liguria.

Olea europaea, the olive tree with cultivation widespread in the whole Mediterranean basin, is responsible for frequently severe pollinosis, particularly in some regions of the southern Italy.

In the Mediterranean area there are characteristic climatic conditions (mildness of winter, summer dryness, etc.) that facilitate the growth of a typical vegetation with production of allergenic pollen grains such as those from *Parietaria* and *Olea europaea*, very different from those of central and northern Europe.¹⁻⁴ Italy has a central position in the Mediterranean basin, but because of its geographic characteristics, there are different climatic aspects with different vegetation between the northern, central, and southern areas.¹⁻⁷

Several concurrent climatic and geographic factors promote the growth of many wind-pollinating plant families and species in Italy. As a consequence, pollen-related allergies are the commonest allergic complaints in this country. Further, in Italy there is great interest in aerobiologic studies, and sampling of airborne pollen grains with volumetric, Hirst-like instruments (Burkard or Lanzoni) is carried out by a

network of more than 60 centers scattered all over the Italian peninsula.³

Data on the presence and prevalence of allergenic pollen, obtained from aerobiologic studies and from allergologic investigations, made it possible to design a pollen calendar with the approximate flowering period of the plants in the area in which the sampling is carried out (Figs. 1 and 2). In this way it is possible to compare the changes for high atmospheric allergenic pollen concentrations in different areas, which can be useful information for the allergic patient when his travels are being planned or in preventing the possible appearance of severe hay fever symptoms by appropriate medication or other measures.

In Italy, we find a typical vegetation with presence of some allergenic plants, such as *Parietaria* and *Olea europaea*, besides various species of Gramineae and mugwort.^{1,2,5}

From allergologic studies in Italy the frequency of clinically expressed pollen allergy (ie, oculorhinitis, bronchial asthma) can be estimated at approximately 10% to 15% in adults and 5% to 10% in children living in urban areas during the months of May through June.¹ The prevalence of hay fever in urban areas is about twice as great as in rural areas.^{1,2}

Pollen grains of Gramineae, *Pari-*

etaria, olive tree, and mugwort represent the most frequent causes of pollinosis in Italy, but other *taxa* may play local or minor roles. Such plants are cypresses (*Cupressus* spp.), birches (*Betula* spp.), hazel (*Corylus avellana*), and plantains (*Plantago* spp.).¹⁻³

Due to physical and geographic peculiarities of the Italian peninsula, important changes are present in vegetation and consequently in aerobiologic patterns from the northern regions with a continental and rather middle-European climate to the southern areas with a Mediterranean-subtropical climate. Furthermore within the same main region major differences may occur due to the influence of local factors. An outstanding example is represented by the coastal Liguria region. This vast district, facing the Mediterranean sea on a coastal line of over 270 km, although relating to northern Italy, enjoys a typical Mediterranean climate.¹⁻³ Another example is the "Lombard Lakes District," and particularly the lake of Garda, where the presence of comparatively large bodies of water and other local factors cause these areas to be considered as Mediterranean enclaves in a middle-European context. On the other hand, in the southern regions, along the Apennine range, altitude above sea level and locally abundant rainfall

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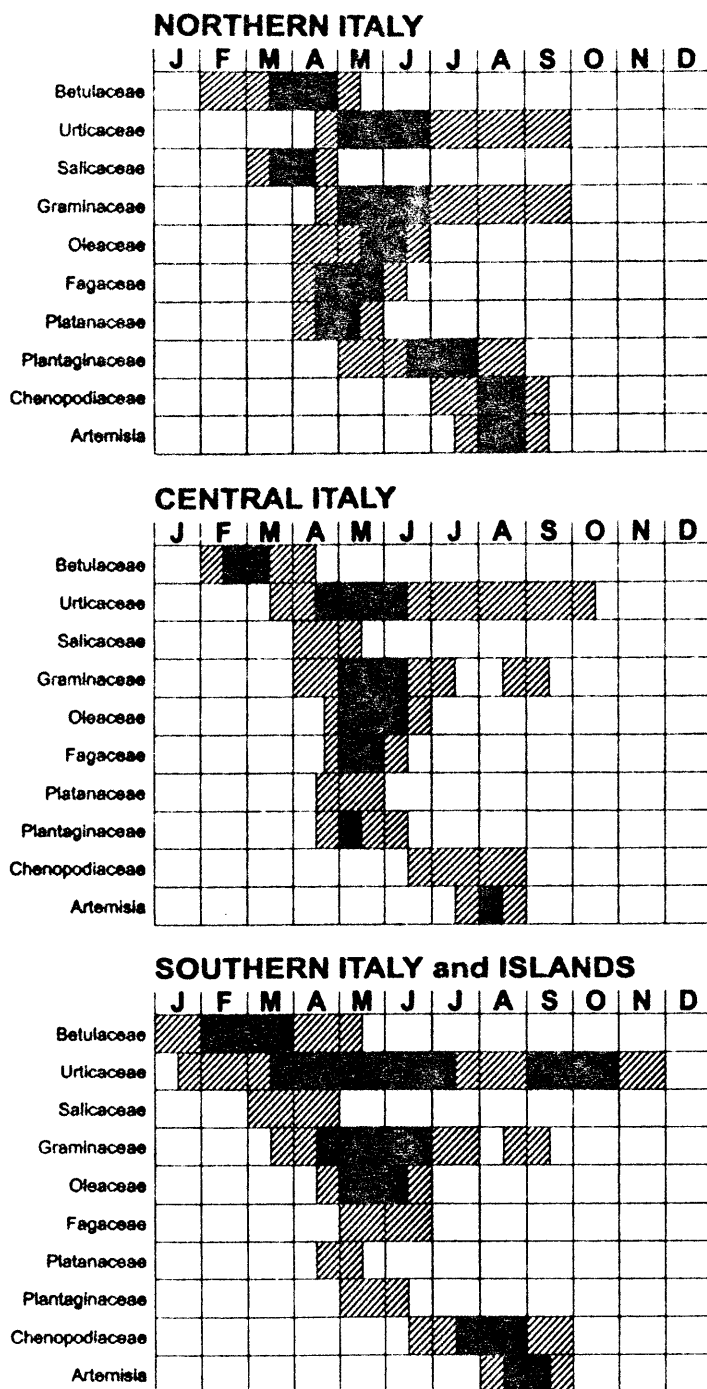


Figure 1. Pollen calendars in Italy for geographic areas (northern, central, southern and islands). ■ Principal pollen period with atmospheric concentration higher than 30 pollen grains/m³ as mean value. ▨ Initial and terminal pollen periods.

may give rise to microclimatic and floristic situations of Alpine or middle-European type.^{1,2}

These long-recognized and ac-

cepted phytogeographic considerations have been supported by aerobiologic studies as well as by a number of clinical observations of the

affected populations. A summing up of all the available aerobiologic data allows us to conclude that, although a changing spectrum of aerobiologic models exists in Italy, two main patterns may be recognized: a northern Italian pattern and a southern Italian insular (Sardinia, Sicily) and Liguria pattern, with a gradual switching from the first to the second for central Italy.^{1-3,5,6} The northern Italian aerobiologic pattern is of the continental type. Grasses dominate the picture with a heavy spring-early summer season. In this period we find also pollination of Urticaceae. This major season is preceded by a "low tree season" supported mainly by Betulaceae.¹⁻³ Mugwort supports the typical fall season. The last decade has witnessed diffusion of ragweed (mainly *Ambrosia artemisiifolia*) into the outskirts of various northern cities.⁸ Now the *Ambrosia* species are widely spread in several areas of Piedmont and Lombardia. The clinical impact of *Ambrosia* pollen has not yet been fully assessed although the first cases of sensitization have been reported.⁸ In southern Italy the main allergenic pollen is produced by *Parietaria*⁹⁻¹⁶ followed by Gramineae and *Olea europaea*.^{1,2}

Now we would like to focus attention on the pollen grains of major allergologic interest in Italy: *Parietaria*, Gramineae, *Olea europaea*, and *Artemisia vulgaris*.

Parietaria (pellitory-of-the-wall) is one of the most relevant allergenic plants in the Mediterranean area^{7,9,10} and the most important in some European regions such as southern Italy and the Mediterranean coasts of France^{10,17} and Spain.¹⁸ *P. officinalis* and *P. judaica* are the most common species within the genus *Parietaria*, that includes also *P. lusitanica*, *P. mauritanica*, and *P. cretica*.¹⁹ *P. officinalis* and *judaica* have different distribution areas, the latter being widespread all over Italy, particularly in southern Italy, whereas *P. officinalis* is mainly

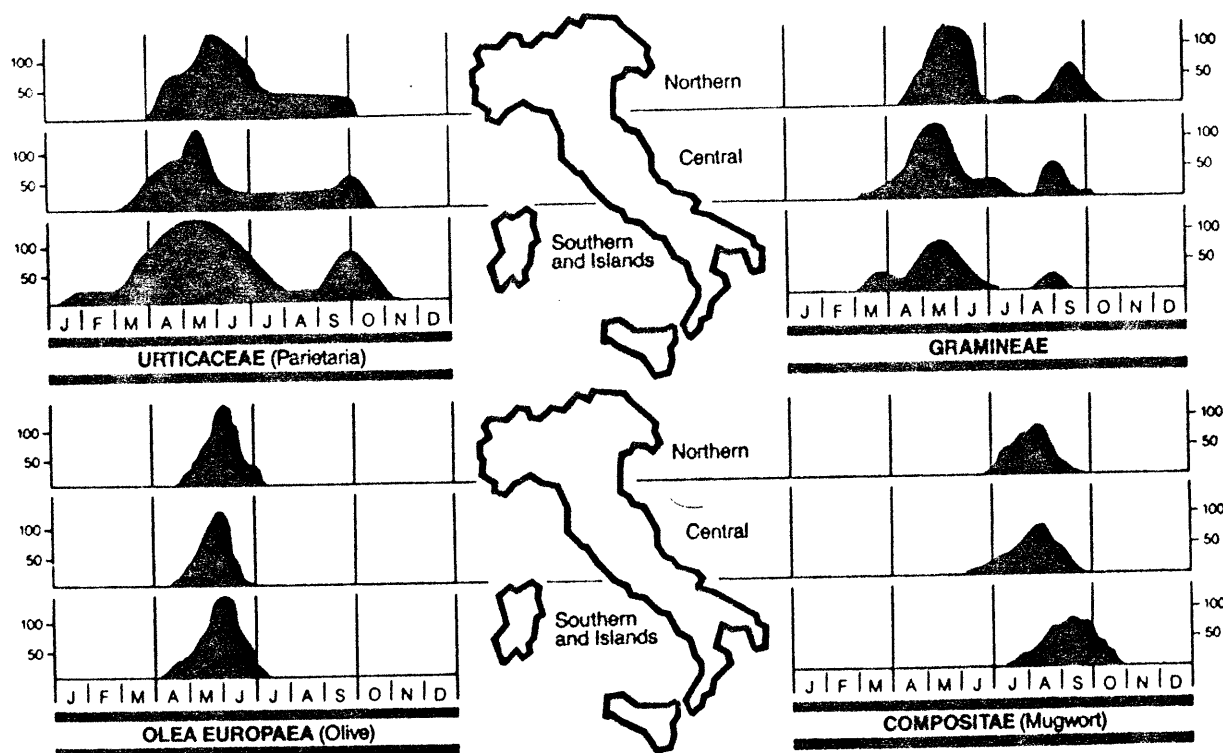


Figure 2. Behavior of the most important allergenic pollen grains in Italy for various geographic areas (northern, central, southern, and islands). Weekly mean values (from daily counts) of number of pollen grains for m^3 of air in various years from 1980 to 1990. A calendar unifying the data from cities with different latitudes and different climates is only indicative. As concerns Urticaceae (including genera *Parietaria* and *Urtica*) the pollinating period of *Parietaria* and of the allergenically less important genus *Urtica* overlap. It is not possible to distinguish these two types of pollen grains by means of microscopic analysis.

present in northern and central Italy. There is allergenic cross-reactivity between *P. officinalis* and *P. judaica*¹⁰⁻¹² and not between *Parietaria* and *Urtica*.^{10,11}

Parietaria, whose very strong allergenic components are now known¹⁰⁻¹⁶ grows especially on walls inside towns and has two very long cycles of flowering (Figs 1 and 2). During the spring, especially from April to the end of June, the greatest pollination period of *Parietaria* takes place (Figs 1 and 2). Less pollination occurs from the end of August to the end of October, then *Parietaria* pollen progressively diminishes in the atmosphere, to disappear during the months of December and January. *Parietaria*, typically a wind-pollinated plant, sheds large quantities of pollen grains also in calm atmospheric conditions because of a mechanism

of propulsion operated by its elastic anther's filaments. Factors influencing the pollen output by this anemophilous plant include temperature, humidity, and light intensity. The anthers of *Parietaria* open during favorable weather, particularly when it is warm and dry. Consequently they tend to open during daylight hours, from early morning to afternoon. The distance of the pollen trap from the ground is a critical factor: in the absence of wind the pollen is detectable mainly at ground level. Consequently, it can't be picked up in consistent amounts by a pollen trap placed at the roof level. This may explain the presence of symptoms in sensitized patient despite low pollen counts.¹³

The *Parietaria* pollen counts from the end of April to the end of June in southern Italy vary from 100 to 500/ m^3 of air, sometimes

reaching peaks of 700 to 800 pollen grains/ m^3 of air, depending on the area's climate and on yearly variability of pollen production.^{2,13}

Recently the atmospheric concentration of Urticaceae pollen in northern Italy has increased; consequently, allergic sensitization to *Parietaria* in this area is rising also.^{1,3,13}

Pollinosis due to *Parietaria* appears most frequently between the second and the third decades of life and is more frequent among people living in coastal towns than among dwellers of inland urban areas.^{1,2,7,13,20} *Parietaria* pollen in southern Italy is responsible for multiseasonal symptomatology that sometimes can be perennial, causing chronic inflammation of the airways.^{20,21} Because of its atypical clinical features, patients could be erroneously thought to have "intrin-

sic" asthma. In areas where the pollination period is shorter, severe late asthmatic reactions (LAR) may occur.²¹

Grasses are also a cause of pollinosis in the Mediterranean pattern, and locally may assume a major role.^{1,2,3,6,20,22} Allergic sensitization to Gramineae (Poaceae) is prevalent in northern and central Italy with the exception of Liguria where the frequency is lower due to the Mediterranean climate.^{1,2,3,5}

Gramineae pollination periods vary and airborne pollen totals are influenced by differences due to the various species. The flowering period of Gramineae generally starts in May in northern and central Italy and in the middle of April in the south. Flowering continues until the end of June, then decreases in July and August and reaches a new but generally lower peak between the end of August and September, especially in northern Italy (Figs 1 and 2). The average values of Gramineae pollen concentrations in the atmosphere are lower in the south as the average temperature is higher and the grasses dry more rapidly.^{1,2}

Allergenic pollen grains are produced also by *Olea europaea*, the olive tree, the cultivation of which is widespread in the entire Mediterranean basin,^{23,27} where it is responsible for frequently severe pollinosis, particularly in some Italian regions such as Puglia and Liguria.^{26,27} Clinical and aerobiologic interest is largely justified by the sometimes copious pollen productivity of *Olea*, with a pollination period lasting from May to the end of June, by the high allergenic content of its pollen and by the high frequency of allergic sensitization with clinical manifestations of oculorhinitis and sometimes asthma.^{26,27}

Notably lower concentrations of other pollen grains are found in Italy. Among the Compositae only mugwort reaches atmospheric concentrations higher than 50 pollen grains/m³ of air with a pollination period lasting from the end of Au-

gust to the end of October (Figs 1 and 2). The frequency of sensitization to allergens of *Artemisia vulgaris* ranges from 10% to 20% in patients with pollinosis in various Italian regions.¹

As regards other allergenic pollen grains cypresses may be locally important^{1,28} supporting a so-called "winter-pollinosis" from January to March. Other pollen grains (among herbaceous plants *Plantago* and *Chenopodium*, and trees *Betula alba* and *Corylus avellana*) are minor causes of hay fever in Italy.¹⁻³

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MECHANISMS OF ANTIGEN-INDUCED NASAL AIRWAY HYPERRESPONSIVENESS

Nine patients with seasonal allergic rhinitis caused by either grass or ragweed pollen were studied to investigate the mechanisms associated with increased responsiveness to nonallergic stimuli following intranasal antigen challenge. Response to challenge was assessed by number of sneezes and measurement of albumin and TAME-esterase in nasal lavage fluids. Numbers of eosinophils, neutrophils, and alcian blue-positive cells were determined after antigen challenge but prior to challenge with histamine.

Responses to both antigen and histamine were unchanged 24 hours following histamine challenge. Twenty-four hours following antigen challenge the response to histamine was increased returning to baseline after 12 days. Daily antigen challenge for three days did not further increase responsiveness. Numbers of inflammatory cells recovered by nasal lavage following antigen provocation but before histamine correlated with the degree of change in histamine responsiveness.

The investigators conclude that histamine does not increase responsiveness to itself or antigen but that antigen provocation causes an increase in histamine reactivity associated and correlated with an inflammatory cell infiltrate.

—JGE

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