

First approach to recognizing allergy provoking flora in the city of Padua (Chormophyta). Species included in public and private vegetation within the sixteenth century city walls

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SUMMARY. During research on the possible differences between the flora urbana in Padua at the beginning of the century and at present times, a considerable concentration of allergy-provoking species has been observed. In addition to the list of these species, this first approach includes some proposals and comments on the ways of managing public and private green areas.

Key words: allergy-provoking flora urbana, phenology, public and private green areas.

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THE AREA STUDIED

During the last hundred years Padua has undergone radical transformations. In fact up until the end of the nineteenth century and the beginning of the twentieth, the city had kept its waterways intact, even though they underwent embankment, barrage and deviation works. The fabric of the city that extended within the sixteenth century walls had many open spaces used for the rearing of livestock and for agriculture and other much depressed areas where stagnant water collected spontaneously and where fishponds were set up.

However, at the end of the last century, covering works had already been started up along most of the navigable canals, as well as works for urban re-organization and these were concluded towards the end of the 1950's.

City centre organization was carried out in a different way as a consequence to the new problems of «modernization» which arose after the war. This, together with the transformation of many surrounding rural areas into city outskirts and the consequent removal of the borders between the city and the countryside farther afield, the increase of commercial exchange with ever more distant towns have all considerably unbalanced the phyto-ecological order of the city and have favoured the establishment or the spreading of some species and the rarefaction of others, resulting in their complete disappearance.

A comparison between *Flora Padovana* by A. Béguinot, which lists all the species present in Padua and its province at the beginning of the century, placing special emphasis on those found within the sixteenth century walls, and a

study carried out during the years 1988-89 in the same area together with a tree census promoted by the Municipality, allows us to document the extreme changes in the flora and in the environment of the city. The picture which appears should obviously be considered to be in constant and continuous evolution. The urban transformations which are currently being carried out for improvements will also be decisively influential.

However, many species typical of the eastern area of the Padano-Veneta plain have disappeared, such as *Agrostis interrupta* L., *Phleum paniculatum* Huds., *Antemis tinctoria* L., *Picris echioides* L. (= *Helminthia echioides* (L.) Gaertn.); while the following, typically cosmopolitan species have appeared or remained: *Poa annua* L., *Sonchus oleraceus* L., *Plantago lanceolata* L., *P. major* L. and *Parietaria officinalis* L., resulting in the present, commonplace *flora urbana*.

Many of the species which are present are ruderal, typical of abandoned sites, of walls and ruins or weeds, common in areas rich in nitrates and phosphates.

Their abundance is due to numerous causes, among which the most evident are: a) the presence of mono- or pauci-specific lawns in many gardens or in the flower beds along the road-sides, where only weeds can establish themselves, and b) the state of total abandon in which many buildings are left, even in areas of the centre. In fact, this lack of care permits the rapid expansion of many ruderal species and the progressive impoverishment of the town's flora. This has permitted many plants with a very wide ecological valence, among which many allergy-provoking types such as *Parietaria officinalis* L., *Poa annua* L., *P. pratensis* L., *Robinia pseudacacia* L. and *Artemisia vulgaris* L. to colonize wider and wider areas.

Parietaria is one of the most common grasses in the studied area (and also in the surrounding urban areas); in fact it occupies a large number of

the ruderal areas which can be colonized. Its presence is remarkable in the garden of the Civil Hospital and the University Clinics and in the inner courtyards where it forms mono-specific carpets which cover all available spaces.

Also many trees that have been and are still planted in the town produce a severely, allergy-provoking pollen (*Carpinus betulus* L., *Ostrya carpinifolia* Scop. and *Acer negundo* L.).

ALLERGY-PROVOKING FLORA URBICA

The study and the collection of the present, spontaneous or naturalized *flora urbana* which was started in 1987, proceeded for three vegetative seasons (Pecere, 1988-89; Gurrisi, 1988-89) and is being continued at present in order to follow the modifications in composition and abundance.

There were 195 species counted in the census and many of these (21%) have a medical-pathological importance, due, above all, to the production of a severely allergy-provoking pollen; among these, some are widespread in the urban area; others can be found only in certain areas, such as the hygrophites which grow along the sides of rivers and canals. To these we can also add the large number of trees and shrubs that decorate roads, squares, parks and private gardens. In order to have a more rapid analysis of the collected data, the studied area was subdivided into four zones (Fig. 1) which can be referred to in order to define the distribution of the various species counted in the census.

These plants are listed herebelow following the order used by Pignatti (1988) in «Flora d'Italia». We have also indicated their origin (Spont: spontaneous, Cult: cultivated), their diffusion (V. ab.: very abundant, Ab.=abundant, C=common, R=rare, RR=extremely rare), their location and the zone in the considered area where they are most widespread, their flowering period (expressed in Roman figures, Tab. I and II) and their biological form:

Grhiz: Geophyta rhizomatosa
Hcaesp: Hemicryptophyta caespitosa
Hros: Hemicryptophyta rosulata
Hscap: Hemicryptophyta scaposa
Pcaesp: Phanerophyta caespuliosa
Pscap: Phanerophyta arborea
Tcaesp: Terophyta caespitosa
Tscap: Terophyta scaposa

The area studied was divided into four sub-areas according to the urban structure of the town within the sixteenth century walls:

Zone A: the historical centre

Zone B: the residential area around Prato della Valle excluding the Botanical Gardens

Zone C: the University Clinics and Institutes

Zone D: the area of the Riviere along the Tronco Maestro canal and the north-east walls of the city.

It was necessary to exclude the Botanical Gardens so as not to include species that have been introduced artificially and sometimes for only one vegetative season.

The phenological observations were obtained in the years from 1987 to the end of 1990 and were compared with data reported in literature.

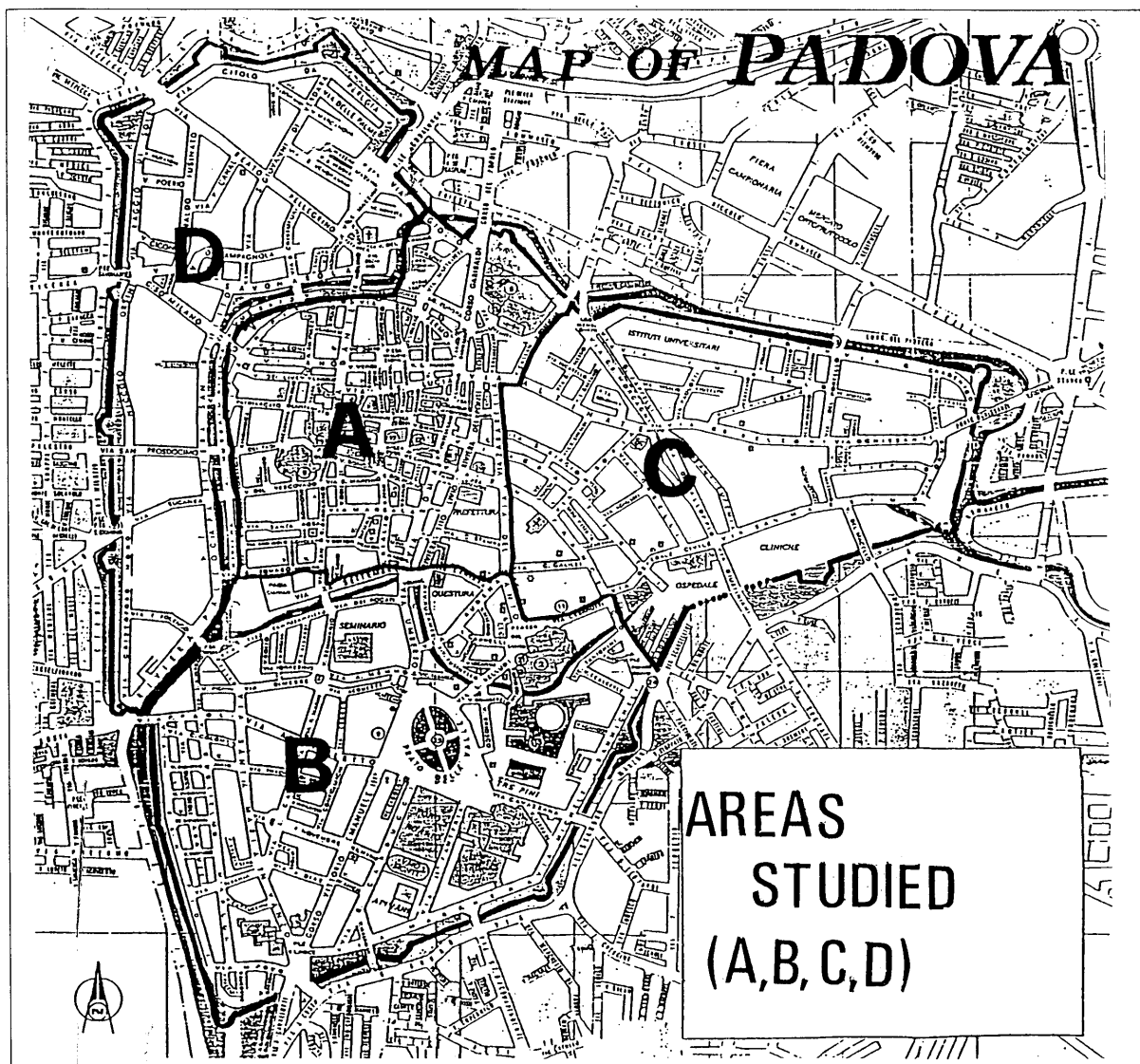


Figure 1. Map of the city inside the medieval walls. Research areas.

Amaranthus deflexus L. ♦
Cynodon dactylon (L.) Pers. □
Lolium perenne L. ☒
Papaver rhoeas L. ♀
Plantago lanceolata L. ♦
Plantago major L. ✱
Taraxacum officinalis Weber ✱
Sorghum halepense (L.) Pers. ✱
Artemisia vulgaris L.]
Chenopodium album L.]
Avena sativa L.]
Rumex crispus L.]
Dactylis glomerata L.]
Sambucus nigra L.]
Lolium perenne L.]
Medicago sativa L.]
Mercurialis annua L.]
Poa annua L.]
Poa pratensis L.]
Parietaria officinalis L.]

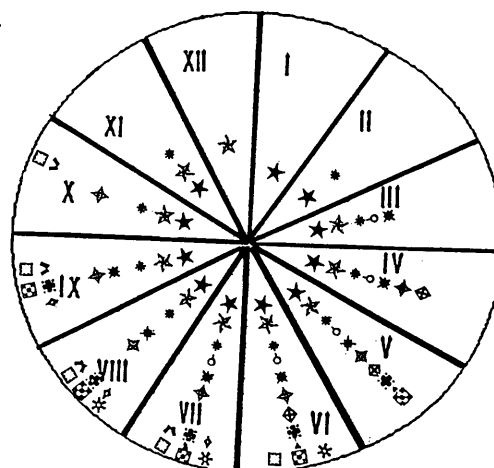


Table I. Flowering months and periods of grass species.

Acer negundo L. ✱
Alnus glutinosa L. ✱
Cedrus deodara Loud. ★
Populus alba L. ✱
Robinia pseudacacia L. ✱
Taxus baccata L. ★
Carpinus betulus L.]
Ostrya carpinifolia Scop.]
Platanus hybrida Brot.]
Quercus ilex L.]
Acer pseudoplatanus L.]
Aesculus hyppocastanum L.]
Fraxinus ornus L.]
Pinus pinea L.]

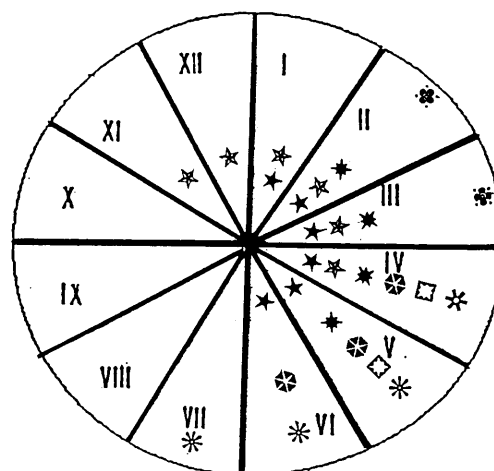


Table II. Flowering months and periods of tree species.

Pinaceae: *Cedrus deodara* Loud. - Cult., Tree, V. ab., zones A & B, II-XI, Pscap.; *Pinus pinea* L. - Spont. & Cult., Tree, R., zones A & D., IV-VI, Pscap.

Taxaceae: *Taxus baccata* L. - Cult., Tree, R., zones A & B., I-III, Pscap.

Salicaceae: *Populus alba* L. - Cult., Tree, C, zones B & D, II-IV, Pscap.

Betulaceae: *Alnus glutinosa* (L.) Gaert. - Spont. & Cult., Tree, C, zones B & D, II-III, Pscap (caesp).

Corylaceae: *Carpinus betulus* L. - Cult., Tree, R, zone A, IV-V, Pscap (caesp); *Ostrya carpinifolia* Scop. - Cult., Tree, R, zone B, IV-V, Pscap (caesp).

Fagaceae: *Quercus ilex* L. - Cult., Tree, R, zone D, IV-V, Pscap (caesp).

Urticaceae: *Urtica dioica* L. - Spont., Gr., Ab., zones B & D, IV-XII, Hscap; *Parietaria officinalis* L. - Spont., Gr., V. ab., zones A, B, C & D, III-XII, Hscap.

Polygonaceae: *Rumex crispus* L. - Spont., Gr., R, zones B & C, V-VII, Hscap.

Chenopodiaceae: *Chenopodium album* L. - Spont., Gr., C, zones A, B & C, VII-X, Tscap.

Amaranthaceae: *Amaranthus deflexus* L. - Spont., Gr., V. ab., zones B, C & D, VII-IX, Tscap.

Papaveraceae: *Papaver rhoeas* L. - Spont., Gr., R, zone C, III-VII, Tscap.

Platanaceae: *Platanus hybrida* Brot. - Cult., Tree, V. ab., zones A, B, C & D, IV-V, Pscap.

Leguminosae: *Robinia pseudacacia* L. - Cult. & Spont., Tree, V. ab., zones A, B, C & D, V-VII, Pscap; *Medicago sativa* L. - Cult. & Spont., Gr., C, zones B, C & D, V-IX, Hscap.

Euphorbiaceae: *Mercurialis annua* L. - Cult., Gr., C, zones B & D, II-XI, Tscap.

Aceraceae: *Acer pseudoplatanus* L. - Cult. & Spont., Tree, Ab., zones B, C & D, IV-VI, Pscap.; *Acer negundo* L. - Cult., Tree, Ab., zones B, C & D, IV-V, Pscap.

Hippocastanaceae: *Aesculus hyppocastanum* L. - Cult., Tree, R, zones B & D, IV-VI, Pscap.

Oleaceae: *Fraxinus ornus* L. - Cult., Tree, C, zones B, C & D, IV-VI, Pscap.

Plantaginaceae: *Plantago major* L. - Spont., Gr., V. ab., zones A, B, C & D, III-IX, Hros; *Plantago lanceolata* L. - Spont., Gr., V. ab., zones A, B, C & D, IV-X, Hros.

Caprifoliaceae: *Sambucus nigra* L. - Cult., Tree, R, zone B, IV-VI, Pcaesp.

Compositae: *Artemisia vulgaris* L. - Spont., Gr., C, zones B, C & B, VII-X, Hscap.; *Taraxacum officinalis* Weber - Spont., Gr., V. ab., zones A, B, C & D, II-XI, Hros.

Graminaceae: *Dactylis glomerata* L. - Spont., Gr., V. ab., zones B, C & D, IV-VI, Hcaesp; *Poa annua* L. - Spont., Gr., V. ab., zones A, B, C & D, II-XI, Tcaesp; *Poa pratensis* L. - Spont., Gr., Ab, zones B & D, IV-IX, Hcaesp; *Lolium perenne* L. - Spont., Gr., C, zones B, C & D, V-IX, Hcaesp; *Avena sativa* L. - Cult. & Spont., Gr., C, zones A, B & C, V-VII, Tscap; *Cynodon dactylon* (L.) Pers. - Spont., Gr., V. ab., zones A, B, C & D, VI-X, Grhiz; *Sorghum halepense* (L.) Pers. - Spont., Gr., V. ab., zones B, C & D, VI-VII, Grhiz.

CONCLUSIONS

There are many spontaneous or naturalized plants that have established themselves in the historical city centre of Padua; to widen the area of study would do nothing but increase their number without changing the situation very much.

Some of these plants encumber flower-beds and gardens or the borders along roads, others, on the other hand, have established themselves on walls (the historical walls of the city and their doors, the external walls of houses, the façades of mansions and villas, the bell-towers of churches, the cornices and roofs of many build-

ings, etc.), starting up or continuing slow but subtle demolition work.

Many of these plants, to which we must add a large number of trees and shrubs, are cultivated with the aim of being ornamental but they are also allergy-provoking for several reasons, i.e. for the «down» that accompanies the fruit of poplar trees or the hairs found on the stem of the *Parietaria*, etc., and above all because of the characteristics of their pollen.

These plants are frequently concentrated in exploited, public areas such as schools, hospital and University Clinics, nursing homes and parks, both in the considered area and outside it.

Since a lot is now known about the characteristics of these plants, it would be advisable, when planning new parks or gardens and when choosing the trees to be used for lining roadsides, that non allergy-provoking plants be used and that the historical city centre (but also other areas) be completely reclaimed in order to reduce their number drastically. This would bring about great advantages for the health of the citizens as well as increasing the performance of many allergopaths who work in these areas.

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