The useful plants of the city of Ferrara (Late Medieval/Renaissance) based on archaeobotanical records from middens and historical/culinary/ethnobotanical documentation

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Introduction

Ferrara is a well known city of the Emilia-Romagna Region, in Northern Italy (fig. 1), providing one of the best examples of the quantity of information that can be inferred from archaeobotanical analyses from Medieval/Renaissance contexts. The city (10 m a.s.l.) developed around a ford on the Po river in about the 7th cent. A.D., and is one of the few Italian cities whose original layout was not based on the Roman tradition. The Este family ruled Ferrara from the second half of the 13th cent. A.D., and under its control the city rose to a significant position within the Italian states. Today, Ferrara is famous for its historical centre, which is extraordinarily well-preserved, featuring small orchards and gardens, and it was declared a World Heritage Site by UNESCO in 1995.

The archaeobotanical records considered here originate from deposits dating from between the end of the 13th to the 15th cent. A.D. (Bandini Mazzanti et al. 2005, 2006; Bosi 2000; Bosi and Bandini Mazzanti 2006; Bosi et al. 2006, and other unpublished data) and located within the urban environment. Other European cities with records of Medieval seed/fruit remains from useful plants include Prague (Beneš et al. 2002), Gdańsk, Elbląg and Kołobrzeg in Poland, and other Northern European cities (Karg 2007). The archaeobotanical records were collected mainly from refuse pits and brick refuse pits. These were used for disposal of kitchen refuse and floor sweepings (Bandini Mazzanti et al. 2005; Bosi et al. in press). Waste materials from households is important for reconstructing eating habits and understanding how plants were processed. The seed/fruit remains mainly belonged to common food plants, of which the surviving part is waste derived from the action of eating or preparing the plant, indicating that the deposits mainly consist of domestic refuse. However, the composition of these deposits also includes remains of cultivated/cultivable plants of which the presence of seeds/fruit cannot be directly connected with the uses of the plants (for example, leaf vegetables, fibre plants), as well as the remains of wild plants the uses of which are not obvious. The latter are generally included in the group of “wild species non obviously utilized” and are mainly classified as anthropogenic. Most synanthropic records indicated plants growing in nitrogen-rich soil, urban streets and squares, as well as weeded and manured cultivations. These seed/fruit remains could originate from the sweeping of waste materials in indoor/outdoor environments. Consequently, they might simply testify the presence of the relative plants in the open spaces adjacent to the habitation. This, in fact, was traditional in Ferrara, and ancient maps show the city as a patchwork of open and covered areas: streets, squares, houses, mansions, sacred or government buildings,
courts, and household gardens. Today the well preserved Medieval centre of Ferrara still has numerous household and kitchen gardens. Nevertheless, a significant number of these plants also have alimentary/medicinal uses, documented both in contemporary historic-literary-botanic sources, and in Italian ethnobotanical sources. The authors consider it advisable to take this information into account, which, correlated with other data, might widen the range of species utilized in the domestic context.

This work presents a summary of the useful plant finds discovered at these sites, mainly to underline: 1) the useful plants that were used by humans in the urban environment in the Medieval/Renaissance period; 2) their interpretation in terms of use in households, as suggested by the qualitative and quantitative composition of the deposits and/or characteristics of the finds themselves; 3) the usefulness of contemporary historical-literary-botanic sources and ethnobotanical documentation in order to: – extend the group of useful plants, which is possibly underestimated – identify for a species the uses that best justify the presence and/or abundance of the relative seeds/fruit in urban domestic refuse.

Sites and deposits

Samples for macroremains were collected from refuse deposits at 4 sites located within the city (fig. 1).

1) Five outdoor pits, and one former indoor brick latrine reused as a dump, located in the present day Piazza Castello, in a lower middle class suburb, probably craftsmen, dated between the end of the 13th and the second half of the 14th cent. A.D. (Bandini Mazzanti et al. 1992).

2) A brick refuse pit of an urban house belonging to an upper class family, called “The Mirror Pit” (Corso Porta Reno/Via Vaspergolo site), dated between the second half of the 14th and the 15th cent. A.D. (Bandini Mazzanti et al. 2005).

3) A brick refuse pit called the “Ducal Pit” and representing a section of the Ducal Palace (1479 A.D.) of the Este family, in use during the second half of the 15th cent. A.D. It was used for the elimination of refuse from the Este refectories (Bosi et al. in press).


In the Late Medieval age, refuse was dumped in expressly excavated outdoor pits or in former latrines (1). Later, in the Renaissance period, underground brick compartments were built indoors for the specific purpose of household refuse disposal (2,3,4). They were originally sealed, with just one or two small openings through which refuse was discarded (“drop holes”). In the latter, the proportion of naturally occurring seeds/fruit is obviously negligible. The pit fills largely consist of zoological remains, plant remains (seeds/fruit and small quantities of charcoal and unworked wood), and artefacts (ceramics, metal, wood, etc.) which are particularly important for dating.

Methods

Samples were soaked in water and then washed through a battery of three sieves with 10, 5, and 0.2 mm meshes. Seeds and fruits from each fraction were sorted and counted under a stereomicroscope, and identified using a Wild M10 stereomicroscope (up to 80x magnification) against the reference collection, atlases and keys (Anderberg 1994; Beijerinck 1947; Berggren 1969, 1981; Cappers et al. 2006; Davis 1993; Delorit 1970; Frank and Stika 1988; Häfliger and Brun-Hool 1981; Hubbard 1992; Jacomet et al. 1991; Jacquot 1988; Kiffmann 1958; Montegut 1972; Nesbitt 2006; Pignotti 1998; Renfrew 1973; Schoch et al. 1988; Scurti 1948; Spjut 1994; Viggiani and Angelini 2002, 2005; Young and Young 1992). SEM was used for problematic determinations, and Flora d’Italia (Pignatti 1982) and European Flora (Tutin et al. 1964-93) were used for scientific plant names.

Tab. 1 shows the list of records with concentration values (seeds/fruit per litres of washed sediment) and main uses of the plants: first those directly involving the findings, and then those involving other parts of the plant.

Main sources used

Numerous historical, iconographic, and ethnobotanical sources were referenced (Ballerini 2008; Castelvetro 1988; Crescenzi 1536; Ducomet 1917; Ehlert 2002; Flandrin and Montanari 2003; Guarrera 2006; Hertza and Strehlow 1992; Luciano and Gatti 2008a, 2008b; Picchi and Pieroni 2005; Pitrat and Foury 2003; Redon et al. 1994; Sabban and Serventi 1996; Scully 1998; Trenti 2008; etc.), among which the following in particular are noted.

– The recipe book written by Cristoforo da Messisbugo (in the text CM). Messisbugo, of noble birth, worked during the end of the 15th and the first half of the 16th cent. A.D. as a ‘scalco’ (a position combining housekeeper and chef) at the court of the Este family, i.e. just prior to the building of the Ducal Pit. His book “Banchetti, composizioni di vivande et apparecchio generale” was printed for the first time in Ferrara in 1548. It contains over two hundred recipes, with
descriptions of ingredients, and some details on dish presentation and etiquette (Bandini 1992).

- The recipe books attributed to Maestro Martino, cook of the patriarch of Aquileia, collected in the volume, “Libro de arte coquinaria” (15th cent. A.D.), with about 350 recipes (in the text MM). This volume is one of the cornerstones of Italian gastronomic literature, a precious testimony illustrating the transition from Medieval to Renaissance cooking (Ballarini and Parzen 2001).

- The text by Mattioli “I discorsi di M. Pietro Andrea Matthioli, medico sanese, nei sei libri di Pedacio Dioscoride Anazarbeo, della materia medicinale” (1559).

- The texts of Castore Durante (16th cent. A.D.), “Il tesoro della sanità” (1588) and “Herbario novo” (1585), regarding the use of medicinal plants and nutraceutical issues.

- The phytoiconography in the frescos in the Room of the Months (“Salone dei Mesi”) in the Palazzo
Tab. 1

Ferrara (refuse pits and brick refuse pits; Late Medieval/Renaissance): the list of records with concentration values (seeds/fruit per litres of washed sediment. For pedicels and grape skins of *Vitis vinifera*: °<300; **300-10,000; ***>10,000) and main uses of the plants: first those directly involving the findings, and then those involving other parts of the plant.

<table>
<thead>
<tr>
<th>Site</th>
<th>Fruit/seeds: main uses</th>
<th>Other parts of plant: main uses</th>
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K. **Vitis vinifera**: °<300; **300-10,000; ***>10,000.

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<table>
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<th>Culture</th>
<th>Uses</th>
<th>Propagation</th>
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<td>Prunus cerasus</td>
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**Results and discussion**

Prunus avium and Prunus cerasus are commonly used for their fruit in the Mediterranean region. The fresh fruit is consumed raw, cooked, or used in desserts, such as jam or compote. The seeds, on the other hand, are used as a culinary ingredient, particularly in Italian cuisine. Both species are known for their nutritional value and are appreciated for their health benefits. The use of these plants is deeply rooted in the local culture and traditions of the region.
Cherries were popular in Ferrara and were even accessible to the less wealthy social classes (see Piazza Castello site). At that time, sour cherries were appreciated almost more than sweet cherries, either raw or cooked (“A fare un pastello di marene ad altro modo” - CM). Because of their acerbic taste, sour cherries were often used (like pomegranate seeds), as seasonings (“...e un poco d’agresto, o marasche o agresto in grane o marasche secche...”’, advises CM, for a dish based on eels). Today, the province of Ferrara is a key agricultural area for the production of sweet and sour cherries, and is famous throughout Italy. The P. domestica group follows closely, with a predominance of damson plums, perhaps favoured because they were suitable for preservation by drying, and expressly indicated in the ingredients of recipes (MM: “prugne damascene secche”). Interesting in the Mirror Pit is the abundance of P. spinosa, a wild species, the fresh fruit of which are not very palatable. An abundant use of this fruit could seem strange considering the obvious availability of the more enjoyable Prunoideae. Sloes might have been used in the preparation of liqueurs, syrups, and jams (Guarrera 2006; Luciano, Gatti 2008): “...se fece del vino per tuto de uva de brognolo, assay bono da beveré” (“sloes were used in the place of grapes to make a good wine”) (Trenti 2008). P. armeniaca are found only in the Ducal Pit: the easy preservation of this prunoidea by drying could have resulted in it being considered something of a luxury. It is noted that in the August frescos of the “Room of Months” at the Palazzo Schifanoia a garland of apricot fruits and leaves can be seen behind Duke Borso d’Este (1413-1471) who is receiving dignitaries (Piccoli 1989).

Olives (endocarps) - Leftovers from direct consumption. Olive stones (Olea europaea) were found only in the Ducal Pit (78 stones/90 l), and since they were whole it was suggested that olives were eaten raw and not used for making oil. Bowls of olives were a common dish at Este family banquets (CM). The olives exhibit two fairly different morphologies, suggesting two landraces: one has a rugose, elongated stone with a rostrum, and the other, which is more abundant, has a smoother and more rounded stone. As regards olive orchards, these trees were never grown in the Ferrara area and the olives must have been of non local origin, from other areas of Italy and/or possibly also abroad: CM cites for example the use of “olivotti di Spagna” (Spanish olives).

Pomoideae (pyrenes/seeds) - Leftovers from direct consumption and/or refuse from food preparation. Medlar (Mespilus germanica) is the dominant species, probably due to the easy conservation of the robust pyrenes. Pyrus communis, Malus domestica and Pyrus/Malus are rarely found, possibly due to the easy deterioration of the seeds. Alongside the cultivated Sorbus domestica, there are sometimes numerous seeds of wild services (Sorbus torminalis - no present in the Ferrara’s Flora today - Piccoli, in litteris), the small fruits of which can be eaten fresh or used for preserves or in medicinal preparations, like the rather sweet Crataegus monogyna (Luciano, Gatti 2008; Guarrera 2006).

Minor remains of fruit s.l. (small endocarps and achenes) - Mainly refuse of food preparation. Rubus (endocarps), Fragaria and Ficus (achenes) are normally considered indicators of latrines, in particular in high concentrations. However, in the urban sewers, if there were any, they would have been negligible since faecal matter was a valuable and marketable material (Bosi et al. in press) in a rural setting like the Ferrara plain during this period (Cazzola 1989). Organic fertilizers were always in short supply, so much so that their use was limited to vegetable gardens and orchards and they were not used in open fields (Montanari 1999). This is in agreement with the content of the pit fills (usually a highly incoherent matrix of mainly sand and silt lending the sediment a grey-pale brown colour) and with the archaeological interpretation of the use for domestic refuse of the dumps in question. Gastronomic preparations can produce domestic refuse high in these minor remains. The fruit of Rubus sp. pl. and of Morus nigra were used for syrups and jams, and for medicinal applications, after sieving (CM and MM) to eliminate the small endocarps; blackberries were used to dress sauces (MM) and for colouring foods. CM recommended the use of the fruit of Rubus fruticosus for the preparation of black dye and the fruit of R. caesius for blue dye (“...a volerla fare turchina, le more che nascono nelle cese, o fresche o secche, sono buone”). Figs, dry or fresh, were both included in recipes (“A fare frittelle magre di pome e di fichi per piatti sei” CM), and used in sauces (MM) to accompany vegetables and meat.

Large and medium sized berries (seeds) - Food preparation refuse. The seeds of Cucurbitaceae mainly represent the refuse from the “cleaning” of these fruits, which are consumed in a variety of ways. Melons and water-melons were eaten raw. Both bottle gourds and melon fruits were often cooked in cakes (“A fare torta di zucche fresche”; “Torta di marene ... o meloni o fichi” CM), eaten as a fried vegetable (“A fare zucche fritte” CM; “Menestra de melloni” MM), or added to meat and fish dishes (“A fare capponi, o fagiani, o pollastri, o pizzoni in zucche” CM). Likewise, bottle gourds and melon peels and fruits were used to make jams (“A fare composte di scorze di meloni, o zucche” CM). In the Mirror Pit and Ducal Pit numerous fragments of melon seed shells are present. Melon seeds were candied as sweets (“confetti” CM), a practice which might be
connected with the abundance of fragments. The seeds of *Lagenaria siceraria* and *Citrullus lanatus* are both edible and also had medicinal applications. Pomegranate (*Punica granatum*), with its juicy, fleshy seeds, was an ingredient in many Renaissance recipes. The predominance of these remains in the Ducal Pit confirms the luxury food status of this fruit. Pomegranates are depicted in the Room of the Months in contexts linked closely to the Este Court or in luxury settings: pomegranate bushes, laden with fruit (balautstines), appear in the April Allegory fresco (Triumph of Venus) behind a court of ladies and gentlemen gathered together in the Garden of Love (Piccoli 1989). Also in the March fresco, pomegranates decorate a festoon draped over an arch above Borso d’Este, who is administering justice. The relative integrity of the seeds recovered suggests that the seeds were probably not crushed to obtain juice and pomegranate wine, a common practice in Italy (Scully 1998). The direct use of the seeds on foodstuffs appears more probable. The seeds might have been cooked together with other ingredients or used raw in sauces for meat and fish (“Sapore giallo imperiale per piatti dieci … e si potria anche mettere sopra, grane di pome granate…” CM).

**Grapes** (pips/fruit/pedicels) - Leftovers from direct consumption; refuse from food preparation; wine-making marc. The numerous pips of *Vitis vinifera* found in the latrine indicate consumption as a fresh fruit or ingestion in gastronomic preparations. The pips in the pits, where it is rare to find stalks, are most likely linked to the latter. Indeed, in CM’s recipe book more than one third of the 315 recipes include raisins among the ingredients. CM’s recommendation, “piglia libbra una di zibibbo e cavagli l’anime” (“take a pound of zibibbo grapes and remove the pips”) suggests a significant source of waste pips. The famous head chef recommends that several types of grapes should always be kept in store (fresh, dry, and sun-dried), as well as a variety of grape products, including “agresto” (unripe grape juice) and “sabba”. The latter is a special kind of cooked and concentrated must, still typical of this region today. A proportion of the grape pips in the domestic refuse could be the result of leftovers from the preparation of “sabba” or from wine making, which at that time was also conducted in urban contexts. The main information regarding wine making is provided by the perfectly conserved wine making marc used to fill a dump in the village of Porta Castello (not shown in tab. 1). A study of the marc (Bandini Mazzanti *et al.* 1992 and unpublished data) revealed that: - wine making was conducted by “light” perpendicular pressing. The pips are intact and inside the exocarps, in which residues of pulp are visible; - stalks are completely absent, indicating that only the grapes themselves were pressed, possibly removed from the stalks using a comb; this procedure avoids the stalks increasing the acidity of the wine; - the grapes are almost always without pedicels. This could indicate a vine with grapes that when mature form a layer of abscission at the point of insertion of the pedicels into the grapes (Failla 2007), for example the Emilian Ancellotta vine or the Piedmontese Dolcetto vine (Lavezzaro and Morando 2008). This characteristic, considered a primitive feature, is now revalued because it facilitates mechanical harvesting of grapes for wine making (Gatti and Poni 2007). The practice of wine making using raisins, when the drying process might have weakened the connection between grape and pedicel, is another possibility.

**Nuts s.l.** (endocarps/pericarps fragments/tegment fragments) - Leftovers from direct consumption and refuse from food preparation. A characteristic feature of Medieval/Renaissance Ferrara is the scarcity of nutshell fragments in the refuse deposits (e.g. *Pinus pinea*, *Corylus avellana*, *Juglans regia*, etc.). In the case of *Juglans regia* (walnuts) the traces of combustion visible on various fragments lead to the conclusion that endocarps were used as a fuel to liven up household fires. This would justify the scarcity of remains despite the appreciation for nuts documented historically (Nada Patrone 1989; Flandrin and Montanari 2003) and served on upper class tables, including those of the Este family: “nuxe per fare garui per la tavola del Duca”, reports the “Registro della Grassa” of 1508 (Trenti 2008). *Castanea sativa* is rare; the remains of shells show traces of combustion that might suggest elimination of waste by burning and/or the habit of roasting chestnuts (“…ma i più, cocendole, le arostiscono, poste in una padella … o sotto le calde ceneri” - Castelvetro 1988).

**Cereals (caryopsis), pulses (seeds) and hemp (achenes)**

**Cereals and pulses** - Refuse of food preparation. Cereals and pulses were scarce, and this could be due to taphonomic reasons, like for example, the absence of storage in the deposits studied. Remains were found charred, probably originating from the kitchen fireplace. *Cicer arietinum*, was only present in the Ducal Pit, and small in size, suggesting the Desi type (red chick-peas). Red chick peas are mentioned more than once by CM and MM. These cereals and pulses were mainly used in vegetable soup (“Brodo de ciceri rosci; Miglio con brodo de carne” MM). *Sorghum* was mostly uncharred, suggesting that this plant was used differently, probably to make brooms, as still today in the Ferrara area (Revedin 1909).

**Hemp** - Food preparation refuse. *Cannabis sativa* was commonly cultivated for fibre in the lowlands of the region, mainly in the Bologna and Ferrara Provinces, up to recent times. The neighbourhood of Ferrara particularly...
suited this cultivation, with extensive wet environments suitable for hemp retting (Bandini Mazzanti *et al.* 1999; Bosi 2000; Marchesini 1997). Hemp “seeds” in domestic refuse probably represent refuse of food preparation. Hemp seed soup was popular at the time: MM says, “piglia la sementa di canipa, et lassala stare a moglio per un dì et una noche buttando via quelli granelli che stanno sopra l’acqua perché sonno tristi” (“leave the hemp seeds to soak overnight and throw away the ones that float because they are not good”).

**Oil plant**

**Turnips** (seeds) - Oil making refuse. The most interesting records of oil plants were the seeds of the
Brassica rapa subsp. rapa/subsp. sylvestris found in the Mirror Pit (second half 15th to beginning 16th cent. A.D.) (Bandini Mazzanti et al. 2005). They were particularly abundant (> 30,000 seeds/12 L), and in a state of preservation indicating pressing to obtain oil: prevalently concave-convex as a result of a pressing action.

Aromatics/seasonings/vegetables/medicinal plants

Taxa of which the seeds/fruit were used - Mostly refectory refuse. Aromatics/seasonings accompany more or less all the recipes based on the most varied foodstuffs (meat, fish, vegetables, eggs, etc.). The "seeds" were often used whole (not crushed) and were sometimes added at the end of preparation, after cooking (GM and MM). It is obvious that the elimination of any leftover foodstuffs (in particular bones and fish remains, found quite abundantly in these pits) carries with it leftover foodstuffs in cooking (MM). As regards plant parts commonly used other than seeds/fruit, it is doubtful that their processing in a domestic context would have left seeds/fruit in the refuse. This could have happened if they were used for their flowers/inflorescence (for example Matricaria chamomilla, Malva cf. sylvestris, Anthemis cf. campestris, etc.), but is very unlikely for plants used for hypogeal parts or young heads. Of all these species only a few are cultivated/cultivatable plants (i.e. Daucus carota, Rosmarinus officinalis, Origanum majorana) with the others mostly common synanthropic species (i.e. Chenopodium album, Cirsium arvense, Picris hieracioides, Mercurialis annua, Rhaphanus raphanistrum, Rapistrum rugosum, etc.). It is probable that their carpological remains indicates the presence of the respective plants in open areas close to the habitations (vegetable gardens, courtyards, roads, squares). This could also suggest their maintenance by humans in domestic vegetable gardens. For their alimentary applications, humans might have permitted the presence of these “weeds” without removing them up to the reproductive season and thus permitting them to seed. For a few of these, actual sowing is cited, for example of Sanguisorba minor and Chenopodium album (Durante 1585).

Cyperaceae (achenes) - questionably, finds documenting use as straw. This group mainly includes sedges (Carex sp. pl.) and spikerushes (Bolboschoenus maritimus, Eleocharis palustris/ uniglumis type, etc.), with a total of 15 species/carpological types identified. These seeds/fruit of wetland plants could have arrived accidentally in the pits, possibly in mud trampled in open areas or through the use of lime to fertilize the orchards or to construct tamped earth floors. They fit well with the context of an environment abundant in water, as illustrated in the carpological assembly of open areas of the Ferrara archaeological stratification (Bosi 2000). A possible source of achenes is the use of litter on the flooring of houses and/or for domestic animals. The straw would have been periodically removed and changed. This form of use would have produced large quantities of Cyperaceae achenes in domestic refuse. These plants provide excellent litter and were easily

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found in the wet environments surrounding Ferrara. It should be noted that Cyperaceae achenes are particularly numerous in the pits of the handicrafts suburb of Piazza Castello. In this type of settlement a greater use of this material would be understandable, both for the maintenance of animals and for covering the flooring of homes.

Ornamental plants (seeds/fruit/leaves/twigs)

Sweepings waste. These records are rare and fairly problematic since their interpretation as ornamentals often depends on the general context. Some wild plants can have a decorative role outside of the natural habitat. The Convent Pit for example had numerous examples of Viola sp. pl., but the Ducal Pit was the highest in ornamentals. Seeds of decorative flowers, i.e. pansies (Viola sp. pl.), superb pink (Dianthus cf. superbus) and crimson clover (Trifolium incarnatum), and achenes of rose (Rosa sp.) were found. The pseudocarps of the rose also have alimentary/medicinal uses (Mattioli 1568; Hertzka and Strehold 1992; Guerrera 2006; Luciano and Gatti 2008), but the achenes uncovered are too rare to suggest waste from the preparation of jams, syrups, or similar. Dianthus superbus is currently a rare and protected species, which grows wild in the Apennines near Parma, in Emilia-Romagna. Some ornamental trees were also present: European yew (Taxus baccata - leaves), Italian cypress (Cupressus sempervirens - twigs) and bigleaf linden (Tilia cf. platyphyllos - pseudosamara). Taxus baccata is a native evergreen Gymnosperm tree, without natural distribution on the Po plain, found in mountainous/sub-mountainous areas of central-southern Italy (Pignatti 1982, 1998). On the Po plain, yew trees were commonly planted for ornamental purposes, especially in urban and church gardens. This most probably also occurred in Medieval times, as suggested by the increase in pollen frequency of Taxus from the Subboreal to Subatlantic period in Emilia-Romagna (Accorsi et al. 1997). Cupressus sempervirens is not a native tree to Italy, and is more widespread in central-southern Italy than on the Po plain. It is known to have been grown as an ornamental plant at least since Roman times (Pignatti 1982). Tilia cf. platyphyllos is a native tree which also lives in common woods and is widely cultivated in urban green areas even today. Other ornamental plants in the Ducal Pit might have included white water-lily (Nymphaea alba) and yellow pond lily (Nuphar luteum). It should be noted that Nuphar had never been recorded before, and Nymphaea was very rare and never found in closed pits like the Ducal Pit. Though these two species were part of the wild flora widespread in wet environments, in this context they were possibly grown for decoration in garden ponds and fountains, probably in the gardens of the Ducal Palace together with the above mentioned flowers and trees. One of these gardens, the Duchess’s Garden (dated second half 15th cent. A.D.), was in the area where the Ducal Pit was excavated. The pollen analysis from this garden, carried out on archaeological layers coeval to the Ducal Pit deposit, showed that ornamental plants were fairly frequent and sometimes abundant in the vicinity of the site, releasing pollen of Taxus, Juniperus type, Tilia cf. platyphyllos, Dianthus superbus type, and Nymphaea alba (Bosi et al. 2006). The latter would have decorated the “Fontana d’Oro”, the golden fountain, located in the centre of the same garden. Other species discussed above might have had combined alimentary and ornamental uses: for example a contemporary chronicle (15th to 16th century A.D.) narrates that on the occasion of an Este family marriage numerous junipers were planted in the square (Trenti 2008).

Conclusions

The well-preserved waterlogged seeds and fruit studied provided much palaeoethnobotanical information concerning diet, cultivation, uses and household activities:

1) The useful plants that were certainly used by humans in the Ferrara urban environment in the Medieval/Renaissance period total about 75.

2) The number might be over a hundred, if the various synanthropic plants are included, for which alimentary and/or medicinal uses are historically and ethnobotanically known. Although it is difficult to be certain regarding their use, it is important to note that historical Medieval/Renaissance documents provide long lists of “herbs” used (Landsberg 2002). There are also records of anthropic maintenance (self-seeding and human seeding) of wild species that today are recorded in ethnobotany (for example Chenopodium album, Sanguisorba minor).

3) An analysis of the composition and appearance of the finds provided information on some domestic preparations and on the forms of use of the vegetables: for example, wine-making, oil-making, mustard-making. Furthermore, the scarcity of remains of “nuts” s.l. and the traces of combustion on walnut shells, bearing in mind that historical sources testify their wide use in contemporary gastronomy, suggests that nutshell were recycled for burning.

4) Comparison with historical sources and ethnobotanical documentation made it possible to extend the group of possibly used plants and identify applications that best explained their inclusion in domestic refuse dumps, also taking into account the appearance and state of conservation of the remains. Examples include: the use of “hemp seeds” for gastronomic purposes and thus
not only as a fibre plant; the direct use of seeds of *Cucumis melo* (candied seeds), and thus not only as leftovers from the cleaning of the fruit; the seasoning/medicinal use of the seeds of *Portulaca oleracea*, *Petroselinum sativum*, and *Apium graveolens*, and thus not only as “leaf” vegetables for seasoning; the use of the seeds of *Brassica rapa* for oil, and thus not only as a vegetable (turnips and turnip heads).

5) The composition of domestic refuse pits in Ferrara is the result of a multiplicity of human activities, among which the most important were probably: leftovers from direct consumption, cleaning and preparation of vegetables for gastronomic purposes, elimination of table leftovers, floor sweepings from indoor and outdoor environments.

6) The attribution of the status of “useful plant” to a species and, even more so, the interpretation of its possible use, cannot be univocal. It depends on a series of parameters and factors that can mutate in each specific case. Among these the most important are: appearance and state of conservation of the find; frequency of the find; overall features of composition of seeds and fruit and other biological documentation present; type of settlement and dump; geographical localization, chronology, archaeological data, information from contemporary historical sources and from ethnobotany.

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**References**


Bosi et al. 2006: G. Bosi, M. Bandini Mazzanti, A.M.

Bosi et al. in press: G. Bosi, A.M. Mercuri, C. Guarnieri and M. Bandini Mazzanti - Food and ornamental plants at an Italian Renaissance Court: the Este family and Ferrara in the 15th cent. AD, in Vegetation History and Archaeobotany, 18, in press.


Crescenzi 1536: P. Crescenzi - Liber commendatorum rurarium, Venezia, Bernardino di Viano, 1536 (1304).


Durante 1588: C. Durante - Il tesoro della sanità, Venezia, Andrea Muschiro, 1588.


Mattioli 1568: P.A. Mattioli - I discorsi nelle sei libri di Dioscoride della materia medicinale, Venezia, Vincenzo Valgrisi, 1568.


Nesbitt 2006: M. Nesbitt - Identification Guide for Near

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