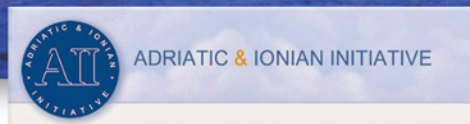


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Relevant aspects of the Abruzzo coast transformation during last centuries (Central Adriatic Italy)

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Abstract

The aim of this study is to shed light on plant physiognomy and landscape changes which have characterized the Abruzzo coast in the past, analysing different historical documents in order to join the information with those related to the actual vegetation focusing on some events and historical processes which influenced the modification of the landscape, causing a huge spillover on natural environment and relapse of the soil use. The existence of different types of coastal woodlands is documented by some texts and geographic maps showing that in the past centuries the Abruzzo coast was covered by thick and impervious forests named "selvae", which were integral part of the economy of local populations, mostly based on non-wood products. About the past plant physiognomy, most of the available information are fragmentary, but a few well detailed documents give an acceptable representation of some plant formations, as in the case of large coastal pine woods, which have been remodeled and reshaped over time, even with reforestation and are today restricted in small areas. Many documents are also important to prove the close link between these formations and the daily life of local people in the past, underlining at the same time their cultural and historical-environmental value. The study of this documentation is also useful for the analysis of those species whose presence status is nowadays considered critical or cryptic, as well as for the study of introduced species which are now historicized in the landscape and in some cases have become typical.

Key words: Abruzzo, Ancient forest, Coast, variation, vegetation, *Pinus*, selvae, species lost, typical.

Introduction

The risks for the Italian coastal environments have been described by several authors over the years (i.e. Cederna, 1975; Arrigoni, 1981; Garbari, 1984; Géhu & Biondi, 1994; Audisio *et al.*, 2002). Recent reports about the issue have been conducted by ISPRA ("Rete Natura 2000, stato di conservazione e trend", 2014), WWF Italia ("Cemento coast to coast: 25 anni di natura cancellata dalle più pregiate coste italiane", 2014), Legambiente ("Mare Monstrum"; 2013); FAI and WWF Italia ("Terra rubata. Viaggio nell'Italia che scompare"; 2012). These documents underline the worrying conditions of Italian environment, more specifically of the Adriatic coast, that is one of the most urbanized areas of the Mediterranean. The simplified sequence of plant communities, from the water's edge up to the hills, may be therefore schematized as follows: beach vegetation, represented by an association with *Cakile maritima* subsp. *maritima*; vegetation of sand-spits interested by seawater ingression, characterized by an association with *Sporobolus virginicus*; vegetation of dune ridges, on elevations, constituted by associations with *Elymus farctus* subsp. *farctus*

and *Ammophila arenaria* subsp. *australis*; vegetation of maquis, dominated by junipers (*Juniperus* spp.); Mediterranean woodland and the related maquis, rich in evergreen sclerophyllous species and with *Pinus* species. *Pinus halepensis* is the more representative one, generally dominant on poorer, parched and termoxeric substrates, with a preference for rocky and detritus ones (of different types and grain size) or in strongly acclivitous slopes. On more fresh and fertile substrates it is more common to find deciduous oaks and those species belonging to the *Orno-ostrietum* s.l. formation; also *Celtis australis* subsp. *australis* is occasionally present. The vegetation of dune ridges, into the hollows, is characterized by alophyllous and alo-hygrophyllous grasslands, rich in Chamaephytes and Hemicryptophytes and succulent plants. Other shrubs are represented mainly by *Tamarix* spp. and *Vitex agnus-castus*. the strips of mesophilic forests are mainly characterized by *Quercus robur* and *Caprinus betulus*. Hygrophyllous wood, constituted by poplars (*Populus* spp.), ashes (*Fraxinus* spp.), willow-trees (*Salix* spp.), black alders (*Alnus glutinosa*) and elms (*Ulmus* spp.). The nomenclature adopted in this paper refers to Conti *et al.* 2005.

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Analisis of the Abruzzo coastal transformation

During the Roman empire period Abruzzo coast showed some signs of urbanization. After the fall of the Western Roman Empire (deposition of *Romulus Augustus*), the coast was under the Byzantine control until the mid-seventh century afterwards under the Longobardic dominion, with a related process of abandonment of the coastal zone led to the disappearance of large settlements like Truentum, ports and villages. The Pest plague of the mid-XIV century led to the vanishment of many settlements, especially in the southern area. With the restructuring of transhumant pastoralism by the Kingdom of Naples, decided by Alfonso of Aragon in the middle of the XV century, most of the coastline of Abruzzo was intended for winter grazing (demonticazione) of sheep flocks. This practice prevented the agricultural exploitation and the establishment of permanent settlements. From the 16th century, the flat areas along the coast and the final stretch of the rivers, which were often subject to winter grazing, were exploited for the cultivation of rice. Abruzzo became the first region within the Kingdom of Naples for its production (Manzi, 2006). Rice cultivation was abolished in the middle of 19th century because of the spread of malaria. During the 16th century, as a result of a general demographic and economic growth, many hilly coastal areas in Chieti province, not subject to the grazing practice, were deforested for plantations of olives trees and vineyards. Several villages were founded from scratch in order to accommodate the need of the Dalmatian and Albanian workforce used to cultivate the land. From the 14th century the region started a market of “mortelle” (*Myrtus communis*) and “lentisco” (*Pistacia lentiscus*), leaves. The forests were used in a few cases for pasture but especially to obtain mostly non-wood materials. Resin and pitch were extracted in the coastal forests; other products were twigs, branches and bark for the furnaces (“legno novo”), dead wood (“legno fracicone”). Especially in the southern part of the region, the woodlands with *Fraxinus ornus* subsp. *ornus* and *Fraxinus angustifolia* subsp. *oxycarpa* were exploited for the extraction of manna. In the 18th century started the industrial exploitation of licorice roots (*Glycyrrhiza glabra*). The rivers were used for the fishing of mullet (*Mugil cephalus*) and twait shad (*Alosa fallax*), which was contracted by the local feudal lords. The fishing of sturgeon (*Acipenser sturio*) was also practiced until the 19th century; this species is not present anymore

and is thought to be extinct within the Italian side of the Adriatic Sea, according to Zerunian (2002) and Kottelat & Freyhof (2007). De Torres (1932) discussed about the name origins of Silvi and Montesilvano cities from the Latin word “*silvae*” referring to past coastal forests once present there. The existence of a large coastal pine forest (Selva dei Chiappini) in the 14th century was reported by Muzii (1923) and a document entitled “Platea storica di Pescara” (1713)¹. The forest was so extended and the density of human population was so low during this period, that only the most peripheral parts that were close to the towns could be used for a notable exploitation. Razzi (1576) described this large pine forest as: “so beautiful that it was a garnish for the sea”. In 1653 huge cuts of this forest were done for the reinforcement of the Pescara Fortress, resulting in protests by local population who depended to the forest products. Other cuts have occurred even later, for various reasons. Palma (1837) described the whole territory of Abruzzo, discussing also about the vegetation; in particular it can be noted: “On the sea level grows naturally the chaste tree (*Vitex agnus-castus*), the mastic (*Pistacia lentiscus*), the rosemary (*Rosmarinum officinale*), the myrtle (*Myrtus communis*), the oxicedro (*Juniperus deltoids*), the Aleppo pine (*Pinus halepensis*)”. He stated that, before the cuts, that forest served as a shield against invasions coming from the sea. He also described the effects of the lack of vegetation on land and on water courses, that are ruined by the absence of adequate plant covering. He underlined the importance of a dense forest coverage to avoid soil instability, especially within the arenaceous coastal areas, where he recommended to plant: “the maritime pines trees... which grow rapidly and whose seeds are easily found on the beach of Montesilvano, where there was a large forest that is now rapidly disappearing in order to put the land under cultivation. This vast forest is marked on old maps under the name of “Selva dei lentischi” or “Selva delli Chiappini” or Ciappini. In addition, there are several testimonies of cuts and illegal deforestation^{2,3}, seldom carried out with the consent of the Marquise D’Avalos, in order to make the land cultivable. In 1890 the works for the opening of a quarry in the area of the pine forest, designed for the construction of the Adriatic railroad⁴, created further troubles in the woody area. The analysis of past data and actual observations show that the term “Chiappino”, commonly used on Abruzzo coast, should refer to the generic term “Pine”, with special reference to the maritime pines and particularly the *Pinus halepensis*.

¹ Ordered by the Marquis D’Avalos. Preserved in the Archivio Storico di Stato (Historical State Archive) of Pescara. Pages not numbered.

² Verbal trial for the contravention of the arts. 96, 104, 173 of the Forestry Act of the 21st August 1826 in force; issued in 1875 by the State Forestry Administration, Department of Abruzzo Citeriore, District of Chieti. Document preserved in the Archivio Storico di Stato (Historical State Archive) of Pescara, envelope 134, folder 10.

³ Report from the Mayor of Pescara to the Prefect of Chieti. 11th November 1879. Document preserved in the Archivio Storico di Stato of the Pescara, envelope 134, folder 10.

⁴Registered mail from the Prefecture to the Major of Pescara of the 13th November 1890 and communication from the Major of Pescara to the Prefect of the Province and following. Documents preserved in the Archivio Storico di Stato of Pescara, envelope 69, folder 38.

Penzig (1924) reported that also *Pinus pinaster* is clearly named “Chiappine” (which is still in use along the coast), “Zappino” (in disuse) or “Pignolo” (term that Penzig associates to the area of L’Aquila; in disuse); the *Pinus halepensis* is reported as “pino marittimo” (still in use, in the whole Abruzzo) or “Pinoca” (in disuse). Manzi (2001) takes these terms but associates them to *P. halepensis*. Tenore (1831) reporting the presence of *P. halepensis* in Abruzzo, adding the following common names: “Pinoca” (Abruzzo) and “Zappino” in Basilicata and Puglia. About the presence of *Pinus domestica* (species that has been widespread in the Italian peninsula, at least since the Roman times), in Abruzzo we can find evidence of an historical presence in the “Statute of Campoli” from the 16th century (Finamore, 1893; Malasecchi, 1973). Albi (1915) dissertation is according that the name of Pescara City does derive from the word Pine in Byzantine Greek. Moreover, in the Chronicon Casauriense, a flumen piscariae meaning “the river of the pine forest”, is mentioned; from the word, “Pefkos” (simplified in “Peskos”). This hypothesis was recently proved by Damiani (2007). The composition of Pescara coastal forest had probably a physiognomy similar to the *Coronillo emeroidis-Pinetum halepensis*, with parts of the *Pistacio-Pinetum halepensis* and shrub lands of *Myrto communis-Pistacietum lentisci* and *Pistacio lentisci-Juniperetum oxycedri*. In the past centuries, people normally did not use roads but small boats to move along the coast because the forest was so impenetrable. There are some nautical charts indicating “local” shipping routes allowing the transfer from the fluvial port to the inner areas. The first known cartographic representations concerning the ancient coastal pine forest of Pescara (1550 to 1650) locate it from the mouth of Pescara river up to Salino river (*Cumara flumen*), with an extension that could be estimated to at least 10,000 hectares covering the whole territory in which today we have Pescara and Montesilvano; extended from the seashore to the hills, occupying the inner land area up to about 400 meters above sea level. It is never represented in the southern part of Pescara river may be because of humidity and clayey soil do not foster its diffusion assuming a “mosaic” aspect, with scattered pines among the broadleaf trees. However, the coastal pine forest of Pescara was covering more or less the whole territory in which today we have the Pescara conurbation. Nevertheless, the old maps show that it extended to the North, up to the river Vomano. No evidences of pine nuts collection here, exclude a significant presence of *Pinus pinea* in this area, reinforcing the idea that the central arboreal element of the Pescara coastal forest was the *Pinus halepensis*. Also the presence of *Pinus pinaster* subsp. *pinaster* is to be considered less characteristic and sporadic for the Pescara coastal pine forest, because as

among the maritime pines it can be defined as “the least Mediterranean”. The documents analysed up to now make inconsistent the hypothesis of an artificial origin of the ancient pine forest. Recent analysis of the ribosomal DNA, carried out comparing several specimens of *Pinus halepensis* from Francavilla to Pineto with others from various Italic locations, including also Dalmatia, seem to confirm that Abruzzo coast specimens have unique genetic features (Damiani, 2007). The ancient forest, now reduced to residual scrubs surrounded by roads and buildings, in the past represented probably the proper element of the area and the entire landscape. The old forest that somehow influenced the poet D’Annunzio is now reduced to residual scrubs surrounded by buildings and roads. Only the so-called “Pineta Dannunziana” survives as a significant entity; it has been largely reforested (between XIX and XX centuries) also with *Pinus pinea* that is now historicized. The area is managed by the Municipality of Pescara with various difficulties and criticalities, despite being declared “Natural Reserve”. According to Damiani (2007), the area looks more like a public garden than a protected area, being subject to further actions of disturbance and erosion of biodiversity. Some parts of the forest today are also affected by the urbanization: the original level of the ground is now lower than the surrounding areas that have been elevated and filled with digging material in order to construct buildings. These areas have become wetter than normal and pines suffer or die, being replaced by elms and other species. More at the north, also the pine forest “Pineta di Santa Filomena”, can be listed among the last parts of the ancient pine forest. It is now looking more as public garden, although it is classified as a “Natural State Reserve”. The Ministerial administration and the Forestry State Corps have partially eliminated the forest and in some case they substitute *P. halepensis* with *P. pinea* and broadleaves.

The dynamics occurred in the last 50 years in Pescara’s park “Ex-Caserma di Cocco” prove how the *Pinus halepensis*, without any anthropic disturbances, could autonomously regain many space by simple secondary succession, recreating evocative landscapes and creating picturesque scenery with trees which reiterate after lying on the ground (Colazilli *et al.* 2014). Other residuals of the ancient littoral pine forest can be currently identified in the territories of Roseto, Pineto, Silvi, Montesilvano Colli, Pescara Colli, Francavilla e San Giovanni Teatino, and more other small nuclei and scattered trees elsewhere.

The problem of the indigenous or not status of some conifer species is still open in Italy, instill this is a problem too subjective, to become sometimes an irrelevant issue, given the historical ties and the widevalence for the territory of these species. The presence of *Pinus halepensis* in Italy is considered indigenous

⁵ Also known as *Liber instrumentorum seu chronicorum monasterii Casauriensis*. Document from the 12th century. Preserved at the Bibliothèque nationale de France (French national Library), Paris.

in almost every region, including Abruzzo (see also: Conti *et al.*, 2005; Conti, 1998; Pignatti, 1982; Agostini, 1964; Brilli-Cattarini, 1965, 1967; Zodda, 1967; Francini-Corti, 1953). As for the other regions, in Abruzzo its presence is sometimes considered questionable only at a local level, due to prejudice or to its use for reforestation. Same authors had often included too general or contrasting considerations. The first study, regarding the vegetation of the “Pineta Dannunziana”, documented with field surveys, dates back to the early 80’s of the last century (Tammaro & Pirone, 1981), followed by explanations of the unique aspects present in that forest (Pirone, 1983, 1985, Pirone *et al.*, 2001). Around Pescara, the *P. halepensis* grows in two different bands, distinct for geomorphology and substrate: the first is the silty and sandy coastline; the second are the geological hills formations, dominated by Pliocene clays (Pirone, 1985). Pirone (2014) also confirms the presence in the Abruzzo of the *Coronillo emeroidis-Pinetum halepensis*, plant association described by Allegranza *et al.* (2006) for the Marche and Abruzzo, giving more value to *Pinus halepensis*. This species extended itself also inland generating remarkable forests, sometimes with other species, mainly *Quercus pubescens* and *Q. ilex*; situations not necessarily always climax, where *P. halepensis* tend to dominate mostly on the more hard areas (Pedrotti, 1982), like in Umbria, (according to Pirone 1985 and Damiani, 2007). These environments, whatever their origin, are important surfaces, often with remarkable forest structure and with wonderful trees and large specimens. Remarkable examples of this, can be found, in the areas surrounding Rosciano, Val Pescara, Gole di Tremonti, Valle del Tirino, Valle Peligna, Valle del Sagittario and Gole di San Venanzio (see also: Damiani 2007; Cianfaglione and Di Felice, 2012), where they insist rocks, steep slopes and parasteppe areas. It would be also interesting to know if the *Pinus halepensis*, has never gone further inside; for example in the area of Pescara, where among other things they insist arid parasteppe areas or supramediterranean tendencies. In some cases, at first glance, it is not possible to understand if a pine forest is from natural or anthropic origin. Even when it can be understood by their planting order, these forests show the presence of interesting natural dynamics with important historical and cultural consequences that fully legitimize their presence. Therefore, the reforestation, both in the coast and the inland, should be considered more as a re-introduction, or as semi-natural environments of various interests. The phytosociological research is leading to new proposals, such as the new order *Pinetalia halepensis* on the *Pinus halepensis* and *Pinus pinea* forests, including also the “long-established plantations” present within their natural area of occurrence (Biondi *et al.*, 2014). Unfortunately, in Abruzzo, like other regions,

we are instead witnessing the elimination or destruction of pine forests, sometimes due to excess of prejudice, sometimes as a result of questionable forestry works. These are publicly funded operations or European projects which theoretically would serve for fire prevention or re-naturalization, but, for the way are carried out, they prove to be speculative, only to take advantage of funding or to get easily virgin biomasses for energetic purposes; jeopardizing the renewal and affirmation of the deciduous trees and the undergrowth. Sometimes fires, as seen for example in the Gole di Tremonti and in various parts of Val Pescara and Valle Peligna, in one hand they can promote the regeneration of *Pinus halepensis*, while destroying the physiognomy of the forest; and in other hand, favoring the erosion and the input of species such as *Ailanthus altissima*. As seen, if these fires would be lit too often or if the areas would be “cleaned up” or left for pasture (of wild or domestic animals), there is an high risk of eliminating the renovation capability, degenerating these woods into something different. This could be a further example of how these ancient forests may have easily disappeared.

At the beginning of the nineteenth century, following the subversive laws of feudalism, many communal or feudal forests were divided and privatized. They were suddenly cleared to be put under cultivation. Many coastal forests and lowland woods were destroyed in order to favor the formation of small private properties and expand the cultivated fields. Other woods were dismembered after the unification of Italy for the same socio-economic reasons. Even the construction of the Abruzzo Railways caused the destruction of the last coastal forests, for various reasons; the wood of the genus *Quercus* was the most sought for the construction of railway ties; where other woods such as beech (*Fagus sylvatica* subsp. *sylvatica*), chestnut (*Castanea sativa*) and conifers were used more marginally. On the coastland up to this period was remaining also a large oaks forest, from some species: mainly to the group of the pubescent oak (*Quercus pubescens* s.l.) with stretches even substantial characterized by the presence of *Q. robur* and also by the presence of *Q. petraea* and *Q. cerris*. These large and dense oak forests, covered a huge part of the northern Abruzzo coast (mostly flat) and many of the most fertile areas and valley bottoms (more orographic), like the inland. Now disappeared, but some huge descendant trees persist as a proof of that, together with toponyms and collective memories. For example, in the locality “Selva Alta”, of the of Mosciano Sant’Angelo Municipality, the people have handed the memory of a very extended forest in the area, with huge trees, and which is famous for an interesting anecdote dating from the 19th century, when Garibaldi’s army arrived in the area, many prisoners escaped from the jails of Teramo and some

of them were able to get away, eluding the scent of the Two Sicilies Kingdom gendarmerie dogs, by covering the all way from Teramo to Giulianova (almost 24 km as the crow flies) through the branches of the trees without touching the ground. This story, regardless of the truth, gives a tangible idea of the dimensions of that ancient forest. Today the residuals of this ancient forest are represented by a large *Q. pubescens* s.l. tree, known as “Quercia Regina” (Queen Oak), together with many other oaks derived from the ancient ones. Also the *Q. dalechampii* has been reported for the coastland, but it is considered as a doubtful species due to the variability of the features observed (Bussotti & Grossoni, 1997). Concerning the holm oaks (*Q. ilex* subsp. *ilex*), the only forest still present today (with big surfaces) is the famous one in Torino di Sangro, albeit reduced, disturbed, coppiced, adjusted and fragmented by time. In fact, the areas with *Q. ilex* have been altered in order to be suitable for cultivation and pasture, to produce firewood and coal. More recently, also because of urbanization and tourism activities. Romanelli (1790), referred also about *Q. suber* trees used for the production of cork in Chieti; and whose presence seems to be confirmed by the analysis of pollen and remains of wooden fragments found in a cistern of the Byzantine age in Crecchio (Sciò, 1993). As for other species, the cork oak (*Q. suber*) can be considered as typical, mostly like native, although it might have been cultivated in the area in the past. Manzi (2012) underlines the existence of some toponyms still present today in the coastal area of Chieti, that seem to refer to trees producing cork; in agreement of another trace, the presence of *Q. crenata*, living in different areas and listed by Conti (1998) and that pertain both to the coast and the inland. The *Q. suber* has not been currently reported in the flora of Abruzzo (Conti, 1998). The nineteenth century was also the period of the reclamation of many humid retrodunal areas, especially around the mouths of the rivers Sangro and Trigno. Some coastal ponds were filled, including those in Vignola and Vasto. The low and sandy coast of Teramo, when pasture servitude was abolished, underwent a profound transformation driven by the construction of the railway. The coastal areas were acquired by middle-class families, coming also from Marche, in order to be reclaimed to boost the agricultural production, often by entering into sharecropping contracts. There was also the beginning of a process of urbanization of the coastal zone with the foundation of new and densely populated urban areas (i.e. Roseto, Pineto, Alba),

destroying huge surface of dunes areas. Azonal forests of the coast were almost eliminated. In a few residual areas where they are trying to re-expand, sometimes with a remarkable presence of *Juglans regia*, even in the industrial zones; struggling against anthropic works, the competition with exotic species, the incorrect cleaning of the waterways, the cuts made to obtain virgin biomasses for the production of energy and the erroneous policies of land management, such as the elimination of the forest along the southern bank of the mouth of the river Tronto, promoted by the local administrations, not for the collection of wood, but in an attempt to deter prostitution.

Between the 19th and the 20th century, Abruzzo (as the rest of Italy) started to witness concretely all the ethical and practical issues regarding the distress of the territory (Orsini & Manzi 2012; Scimia, 2013; Colazilli & Cianfaglione 2014). In the same period, appeared along the coast of Abruzzo, the famous “Città Giardino” (Garden Cities), with villas and gardens; made known by prominent personalities such as Gabriele D’Annunzio and Francesco Paolo Michetti, together with the members of the “Cenacolo Michettiano di Francavilla al Mare”, portrayed the coastal landscape until the ’40s, ’50s. There was an expansion concerning the use of various exotic species (mainly for decoration), species that today can characterize the coastal area in various ways. There was also a strong boost for reforestation and for the creation of public gardens (Ville comunali^{6,7,8,9}). On the Coastal line *Eucalyptus* spp. were also planted (isolated or as reforestation) which are now historicized, reaching a certain ecological and historical-cultural interest, despite being threatened and sometimes destroyed by recent and actual urbanization and by the latest expansion of tourist activities. This eucalyptus is appreciated in the study area by farmers and beekeepers, it is not manifested as invasive, while having a good regenerative capacity after fires.

The reforestation, was a good intervention for soil protection, with its own characteristics and importance (Cianfaglione, 2011; 2014), and that should be seen as a source for biogeographical, historical and socio-cultural study. Nevertheless, these formations have become important and famous in their own way: the best known today is the pine forest of Pineto, planted in the early XX century by the Filiani family, which became the fortune of the namesake town, although it is somehow losing its appeal due to the excessive urbanization, as often happens with other planted coastal

⁶ Postcard. 21st November 1889. Document preserved in the Historical State Archive of Pescara, envelope 2523, file 4.

⁷ 28th July 1903: letter from the State Forestry Administration to the Major of Castellammare Adriatico regarding a “sample of forest plants for the purpose of reforestation”. Original document preserved in the Archivio Storico di Stato (Historical State Archive) of Pescara, envelope c.a. 18, folder 8. And following.

⁸ 4th April 1914: from the Royal Forestry Corps, Forest Inspectorate of Teramo, District of Penne, Brigade of Farindola, to the Major of Castellammare Adriatico. Original document preserved in the Archivio Storico di Stato of Pescara, envelope 2393, folder 05.

⁹ 15th January 1921: postcard from the Royal Forestry Corps to the Major of Pescara. Archivio Storico di Stato of Pescara, envelope 177, folders 8 and 19.

pine forests (Colazilli & Cianfaglione, 2014). Another example is the famous pine forest heavily modeled by the wind (Foresta a bandiera), with remarkable blooms of *Fraxinus ornus* subsp. *ornus* and *Cercis siliquastrum* subsp. *siliquastrum*, at the east entrance of the Gole di Tremonti. Between XIX and XX centuries, the coastal area still retained significant aspects as pleasing scenery; the poet Gabriele d'Annunzio in his poem "I pastori" (The shepherds), describes his memories of the Pescara Adriatic coast, even "wild and green as the pastures of the mountains", from his "Sogni di terre lontane" (Dreams of distant lands) opera. In the period between the two world wars, most of the area was already bound to agriculture and pastoralism; although now the ancient forests were almost completely gone and the reclamation almost all made. Popular cities were made primarily of farmers, fishermen and ranchers, while the "città giardino" were made of noble, wealthy, middle class and cultured people. The town of Pescara prepares a remarkable series of reforestation and planting of trees for ornamental purposes, along the streets of the city; in this regard there are a huge number of documents, archived in the State Historical Archives of Pescara, that attest the plants received by the municipality from various Italian nurseries.

Afterwards, as a result of the explosion of tourism, on the coast of Abruzzo concrete substituted nature. Today it is however possible to find cultivated or abandoned agricultural areas characterized by the growth of reeds (of *Arundo donax*, *A. plinii* s.l., or *Phragmites australis* subsp. *australis*), scrubs like tamarisk (*Tamarix* spp.) groves and also reforestations. A similar scenario is characteristic of some environments on the Conero Mountain in the Marche region and the Gargano Mountain in Puglia (Tassi, 1968; 1971). Finally, a last consideration should be made about the formations of *Robinia pseudoacacia* and the *Ailanthus altissima*: now well represented on the coast, being favored by human disturbance, they are dangerous when competing with indigenous formations. However, sometimes they represent the only possible example of vegetation in the most anthropized and degraded environments of the coast that, otherwise, should be exploited for productive purposes, while saving more worthy of protection locations.

Conclusion

The coast of Abruzzo, from the Roman period to the present days, has faced an alternation between anthropization and abandonment, but every time the anthropization has been significantly higher than the previous re-naturalization. The presence of coastal forests of various types is documented through texts and maps showing evidence of how the area was covered by dense and large "Selve" alias forest of various types: co-

niferous and broadleaved; which were very important for the local population during the history as an integral part of an economy largely made up by non-wood products. It can be noted how the transfer of public areas to private entities, the overbuilding and a strong use of the land has led to changes the environment that have compromised the aesthetic landscape, together with the slope's stability and the biodiversity, reducing and altering the biotic communities and populations and often causing the extinction of animal and plant species, according to Pirone & Conti (1996) and Conti & Pirone (1996). Over the centuries, the changes of the coastal vegetation of Abruzzo have been so deep and massive that the ecosystems were strongly altered. Today there are only small rests of the ancient forests, always remodeled in some way. However, there is still a consistent activity associated to the exploitation of the natural resources of the coastal area. The evidence of the ancient vegetation are rare today, but they still represent the potential vegetation of Abruzzo coastal line. Further analysis of fossil pollen, would be needed to clarify and learn about various details of the past vegetation. The problem of the indigenous or not status of some conifer species is still open in Italy, in-still this is a problem too subjective, to become sometimes an irrelevant issue, given the historical ties and the wide-valence for the territory of these species. The Mediterranean conifers need to be considered as key species for Italian coastlands, in any case, unlike some prejudices that can sometimes be revealed about them and not as the same time with other species of the same level. In particular *Pinus halepensis*, for the Abruzzo is demonstrate to represent a really typical species, with a general high value: in environmental, historical and cultural sense. The pine forests can represent habitats of European Community interest; including also those of artificial origin. By protective, economic and social purposes in which reasons they were planted, these particular and delicate forests have been under progressive evolution until the present day, in which it is clear the priority of the role of this forest ecosystems as caskets for biodiversity, conservation and the protection of the territory. As for the others kind of ancient disappeared forests and environments would be interesting to promote policies to safeguard or recovery them, guaranteeing up to the stage of fluctuation, at least within small representative patches. As is the case of the dunes of San Salvo, where various dunal species once extinct was re-planted and now they are in re-expansion independently and successfully.

Bibliography

- Agostini R., 1964. Aspetti fitosociologici delle pinete di pino d' Aleppo del Gargano. Ann. Accad. Ital. Sci. Forest., XIII. Firenze.

- Allegrezza M., Biondi E. & Felici S., 2006. A phytosociological analysis of the vegetation of the central sector of the adriatic aspect of the Italian peninsula. *Hacquetia*, 5/2: 5-45.
- Albi G., 1915. L'Abruzzo marittimo. De Arcangelis, Casalbordino (CH).
- Arrigoni P.V., 1981. Aspetti del paesaggio vegetale che scompaiono in Italia: la flora e la vegetazione dei litorali sabbiosi. Atti del seminario "Problemi scientifici e tecnici della conservazione del patrimonio vegetale". C.N.R., Collana del Programma Finalizzato "Promozione della qualità dell'ambiente". AC/1/101: 51-57.
- Audisio P., Muscio G. & Pignatti S., 2002. Problemi di conservazione e gestione. In: Ruffo S. (a cura di), Dune e spiagge sabbiose. Ambienti tra terra e mare: 119-146. Quaderni Habitat, Museo Friulano di Storia Naturale, Udine.
- Biondi E., Allegrezza M., Casavecchia S., Galdenzi D., Gasparri R., Pesaresi S., Vagge I. & Blasi C., 2014. New and validated syntaxa for the checklist of Italian vegetation. *Plant Biosystems*. 148 (1-2): 318-332. (DOI: 10.1080/11263504.2014.892907)
- Brilli-Cattarini A.J.B., 1965. Stazioni di *Euphorbia dendroides* L. sul Conero. *Arch. Bot. Biogeogr. Ital.*, X (III,IV): 291-299.
- Brilli-Cattarini A.J.B., 1967. Il monte Conero: aspetti floristici e fitogeografici. *Esercit. Acc. Agr. Pesaro*, III (I): 11-32.
- Bussotti F. & Grossoni P., 1997. European and Mediterranean oaks (*Quercus* L.; *Fagaceae*): SEM characterization of the micromorphology of the abaxial leaf surface. *Bot. Journ. Linn. Soc.*, 124: 183-199.
- Cederna A., 1975. La distruzione della natura in Italia. Einaudi, Torino.
- Cianfaglione K., 2011. Il Bosco e i paesaggi culturali. In: Pignatti S., Aree protette e ricerca scientifica. Da: Atti del Convegno dell'Accademia dei Lincei (Roma, 16 Ottobre 2009) Pisa, ETS ed. 127-134.
- Cianfaglione K., 2014. L'importanza dell'albero e del bosco. *Scienza, cultura e coscienza del territorio*. Temi ed., Trento.
- Cianfaglione K. & Di Felice P.L. 2012. Floral, Faunal and Environmental Diversity of S.C.I. Area (SICIT110097), as a basis for environmental programming and planning (Valle Peligna, Abruzzo Region, Italy). *Transylvanian review of systematical and ecological research* 14: 139-148.
- Colazilli A. & Cianfaglione K., 2014. L'albero tra arte, territorio ed ecologia; con particolare riferimento all'Abruzzo. In: Pirone G., 2014. Alberi, arbusti e liane d'Abruzzo. 2a edizione. Cogecstre Edizioni, Penne (PE).
- Colazilli A., Cianfaglione K. & Di Felice P.L., 2014. Il pino d'Aleppo "coricato" nel parco "ex-caserma Di Cocco" a Pescara. *Natura e Società* 2: 13. Giugno. Federazione Nazionale Pro Natura, Torino.
- Conti F., 1998. An annotated checklist of the flora of the Abruzzo. *Boccone*, 10: 1-276. Palermo.
- Conti F. & Pirone G., 1996. Specie vegetali minacciate di estinzione lungo il litorale abruzzese. *Giorn. Bot. Ital.*, 130 (1): 437.
- Conti F., Abbate G., Alessandrini A. & Blasi C. (eds.), 2005. An Annotated Checklist of the Italian vascular Flora. Palombi e Partner S.r.l. Roma.
- Damiani G., 2007. Una nuova ipotesi sull'etimologia del nome "Pescara". *Rivista abruzzese*, LX (1): 63-70 Gennaio. Marzo. Tip. Mancini. Lanciano (CH).
- De Torres G., 1932. Cronaca e diario del Castello di Silvi (Castrum Silvi). Pescara.
- Finamore G., 1893. Vocabolario dell'uso abruzzese. Seconda edizione. Stabilimento Lapi, Città di Castello.
- Francini-Corti E., 1953. Il Pino d'Aleppo in Puglia. *Ann. Fac. Agr. Univ. Bari.*, Vol. VIII.
- Garbari F., 1984. Aspetti della vegetazione e della flora delle nostre coste marine. *Agricoltura Ambiente*, 23: 45-48.
- Géhu J.M. & Biondi E., 1994. Antropizzazione delle dune del Mediterraneo. In: Ferrari C., Manes F., Biondi E. (a cura di), "Alterazioni ambientali ed effetti sulle piante": 160-176. Edagricole, Bologna.
- Kottelat M. & Freyhof J., 2007. Handbook of European Freshwater Fishes. Publications Kottelat, Cornol, Switzerland.
- Malasecchi L., 1973. Statuto municipale della Città di Campli. ed. F.lli Colleluori, Atri.
- Manzi A., 2001. Flora popolare d'Abruzzo. I nomi dialettali delle piante, l'etimologia, i detti e i proverbi popolari, le antiche varietà culturali. Carabba ed., Lanciano.
- Manzi A., 2006. Origine e storia delle piante coltivate in Abruzzo. Carabba ed., Lanciano.
- Manzi A., 2012. Storia dell'ambiente nell'Appennino Centrale. Meta Edizioni, Treglio (CH).
- Muzii G., 1923. Notizie storiche documentate dell'origine dell'Agro in pianura di Castellamare Adriatico. A. Verrocchio Tipografo - ed., Castellamare Adriatico.
- Orsini P. & Manzi A., 2012. Gli "Scritti di botanica" di Pasquale Gravina. Comune di Pettorano sul Gizio e Associazione Culturale Pietro De Stephanis.
- Palma P., 1837. Osservazioni sulla prosperità della Provincia del Primo Abruzzo Ulteriore. Tip. Angeletti, Teramo.
- Pedrotti F., 1982. Les pinédes à pin d'Aleps de la Vallée de la Serra (Terni). In: Pedrotti F. (a cura di) "Guide-Itinéraire Excursion Internationale Phytosociologie en Italie centrale (2 - 11 juillet 1982)". Camerino, Centro Stampa Università 400-407.
- Penzig O.A.J., 1924. Flora popolare italiana. Tip. del R^o Istituto Sordomuti. [Ristampa, 1972] - Edagricole

- le, Bologna.
- Pignatti S., 1982. Flora d'Italia. Vol. 1. Edagricole, Bologna.
- Pirone G., 1983. La vegetazione del litorale pescarese (Abruzzo). Not. Fitosoc., 18: 37-62.
- Pirone G., 1985. Le pinete a pino d'Aleppo (*Pinus halepensis* Miller) del pescarese (Abruzzo): aspetti fitosociologici. Monti e Boschi, 5: 37-42.
- Pirone G., 1995. La vegetazione alofila della costa abruzzese (Adriatico centrale). Fitosociologia, 30: 233-256.
- Pirone G., 2014. Alberi, arbusti e liane d'Abruzzo. 2a edizione. Cogecstre ed., Penne (PE).
- Pirone G. & Conti F., 1996. Specie vegetali estinte per il litorale abruzzese. Giorn. Bot. Ital., 130 (1): 438.
- Pirone G., Corbetta F., Frattaroli A.R. & Ciaschetti G., 2001. Aspetti della vegetazione costiera dell'Abruzzo. Biogeographia, 22: 169-191.
- Razzi S., 1577. Viaggio in Abruzzo, 1574-1577. [Ristampa, 1984] Studio Bibliografico A. Polla, Cerchio (AQ).
- Romanelli D., 1790. Antichità storico critiche, sacre e profane esaminate nella regione de' Frentani. Napoli.
- Scimia A., 2013. Il bosco e l'Abruzzo. Le vicende e le voci nel II millennio. REA Multimedia ed., L'Aquila.
- Sciò E., 1993. Il paesaggio circostante. In: Staffa, A. e Pellegrini. W. (a cura di), "Dall'Egitto copto all'Abruzzo bizantino. I Bizantini in Abruzzo". Media Editore, Mosciano S. Angelo (TE).
- Tammaro F. & Pirone G., 1981. La vegetazione della Pineta Dannunziana (Pescara). Giorn. Bot. Ital., 115: 299-309.
- Tassi F., 1968. Come può morire un paradiso. Italia Nostra, XI (60): 46-53 Roma.
- Tassi F., 1971. Proposta per un parco regionale del Gargano. Atti del I Simposio Nazionale sulla conservazione della natura. Organizzato dall'Istituto di Zoologia dell'Università di Bari, Bari 21-25 aprile. Cacucci ed. Bari: 231- 254.
- Tenore M., 1831. Sylloge plantarium vascularium florum neapolitaneae hucusque detectarum. Ex typografia Fibreni, Napoli.
- Zerunian S., 2002. Condannati all'estinzione? Biodiversità, biologia, minacce e strategie di conservazione dei Pesci d'acqua dolce indigeni in Italia. Edagricole, Bologna.
- Zodda G., 1967. Compendio della flora teramana. Arch. Bot. Biogeogr. Ital., 43 (1/2): 42.