

**THE PRESERVATION OF "OLIVES FOREST LANDSCAPE"
AS A TOOL FOR TERRITORIAL DEVELOPMENT:
A CASE STUDY IN CALABRIA**

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***Abstract.** One of the typical landscapes of Calabria region is the "Forest of Olives": a centuries-old forest of majestic olive trees that for their dimensions - over 20 m in height and more than 1 m in diameter - can be considered real natural monuments and are a symbol of the traditional olive growing in Calabria. The study examines a number of hypotheses to enhance a part of the area still occupied by these centuries-old olive groves, as a historical and cultural heritage of the community, also considering the possibility of establishing a protected landscape, according to the regional legislation on protected areas, or through the establishment of a SIC area, according to the Directive Habitat n° 92/43/EEC.*

***Keywords:** Forest of olive trees, Gioia Tauro and Rosarno Plain (Calabria region), landscape conservation.*

Introduction

The olive tree is an emblematic species of the Mediterranean regions and, together with vine and cereal growing, constitutes the most traditional and the main agricultural activity, in addition to giving distinctiveness to the landscape (Angles, 1999). The Mediterranean Basin is one of the 34 biodiversity hotspots identified on the Earth; it is the home for several taxonomic groups of endemic plant species, and of mammals, birds, reptiles and amphibians (CEPF, 2010). Many of the endemic and restricted-range plant species depend on such systems of anthropogenic origin even if several of them are threatened by land-use changes and rural abandonment (Tucker and Evans, 1997).

The current physiognomy of the Plain of Rosarno and Gioia Tauro, in Calabria, began to take shape in the second half of the Eighteenth Century, and is the result of some natural, political and social events (the Earthquake of 1783, the French Revolution and the Kingdom of the two Sicilies during Murat), which, in a short time, have radically changed the landscape of the territory. Gradually, there was an abandonment of the inhabited areas perched on the foothills of the Aspromonte, mostly destroyed by the Earthquake and isolated from each other (either for the lack of roads or for bad road conditions, due to heavy autumn-winter rains causing rivers and streams to overflow). Moreover, being very poor,

the territory could not meet the food needs of a constantly growing population, so that the migration process was continuous: groups of people started moving from their houses to plain areas where, once removed the forest vegetation and carried out the necessary land reclamation measures, conditions of life would have become easier.

So, in a short time, the forest formations which were typical to the Plain of Rosarno and Gioia Tauro, such as the forests of cork oaks, oaks, poplars, willows, alders and other Mediterranean plants, have been replaced by the species that would become the most peculiar one of the whole area, the olive tree. Indeed, it was a crop that local people knew very well and cultivated in inland areas, near the towns, so that it was natural to start spreading it on a large scale, even in the areas that would be deforested and reclaimed. In addition, the “success” of the olive crop was facilitated by the fact that it did not cause any particular problem and that the produced oil was appreciated and demanded, in large quantities, from the foreign market. The main export markets were the United Kingdom for lighting; France, in particular Marseille, for the production of soap, Szczecin in Poland, Odessa in the current Ukrainian.

In this way, it began the development of an area remained, until then, rather hidden in modern Calabria and the olive tree became the dominant element of that landscape (Placanica, 1985). Therefore, the area including Palmi-Oppido-Laureana-Rosarno became one of the great centers of olive cultivation and the Plain of Gioia Tauro and Rosarno came to be entirely a “sea of olive trees”. Olive growing turned into "the winning card of rural economy in Calabria at the dawn of the Nineteenth Century" (Placanica, 1985).

As already mentioned, over the years, the landscape of the area is mostly dominated by the olive tree which, even today, shows certain features making it unique and worthy of being handed down, at least partially, in its current monumental reality as a cultural, agricultural and historical witness to the relationship between man and environment.

The present work is part of a research project called "Landscape Architectures in European Rural Areas: a new approach to local development design" (LANDsARE), financed within the Rural Development Programme 2007-2013. In particular, this paper provides for a guide-line and a study on the presence of olive trees and olive growing in the Plain of Gioia Tauro and Rosarno and, specifically, on secular olive groves located in the internal hilly areas, immediately behind of the steep slopes rising towards the Aspromonte massif and forming the so-called "grove or forest of olive trees".

Methodological aspects

The research has developed through the following steps:

- Analysis of historical documents, in order to reconstruct the presence and spread of the olive tree in the Plain of Gioia Tauro and Rosarno in the last

- 300 years;
- Territorial classification and characterization from the ecological and economic point of view, according to the area;
 - Preparation of maps relating to the current distribution of olive groves, starting from the remotely sensed images available on the National Geo-portal;
 - Differentiation of the main types of currently existing olive groves;
 - Identification of the area occupied by the olive groves which, for dimensional characteristics (diameter and height of plants) and for management methods applied in the past, can be classified as olive grove or forest;
 - Photographic documentation establishing the characteristics of olive groves;
 - Interview to some olive groves owners, in order to understand their propensity to create a preserved area / landscape;
 - Definition of management modalities for its preservation

Olive growing in the Plain of Gioia Tauro and Rosarno

The territory occupied by olive groves in the Plain of Gioia Tauro and Rosarno can be divided into two areas with different characteristics according to the history, origin and age of the plants. In the internal foothills, located between 350 and 650 meters above sea level, far from coasts and difficult to access, and constituting the urban area of the Plain of Gioia Tauro and Rosarno until the Eighteenth Century, olives were produced exclusively for own consumption. Bad road conditions, above all during autumn-winter period because of heavy rains, not only limited trade but also people circulation. In this regard, Placanica (1985) observes that, for these difficulties, there were particularly robust people who carried on their shoulders the travelers who wanted to cross rivers and streams. This is the traditional olive growing area: the plants are very high and large due both to genetic characteristics of the cultivars (“Ottobratica” and “Sinopolese”) which are typical of this part of Calabria, such as the superficial and strong roots, and to the free forms of cultivation adopted here. In this case, the distance between the plants is very irregular and is often related to the soil morphology. The olive grove is formed by plants of different age and the replacement of each plant occurs or when it dies or when production decreases significantly. The distribution of trees on the ground is totally random.

Since the beginning of the Nineteenth Century, thanks to the systematic land reclamation measures carried out under the reign of Gioacchino Murat in lowland areas (mostly swampy), in a short time olive growing spread along the Plain of Gioia Tauro and Rosarno, especially in order to meet the huge demand for oil by various European Nations.

These interventions were particularly intense until the second half of the Nineteenth Century so that, in these areas, the oldest plants are, on average,

between 150 and 200 years-old. The tree stand is generally of the same age and the distribution of plants on the ground is quite smooth and homogeneous on large surfaces. These are the plant populations that give an idea of the vastness of olive cultivation and make this area absolutely unique.

The characteristics assumed by olive trees have brought the old agronomists to define these tree stands as "olive groves" or, according to some foreign travelers of the Nineteenth Century, as "olive forest" (Du Camp, 1961; English, 1999). The most ancient trees are characterized by trunks with many cavities forming habitats and microhabitats for the fauna of vertebrates and invertebrates. These cavities mean that the olive trees become vicars of more mature forest habitats (Calabrese *et al.*, 2012). In this regard Gangale and Uzunov (2003), in some olive groves of the Ionian coast of Calabria, have shown that the traditional olive groves are an important habitat for many rare plant species. Biondi *et al.* (2007) in similar environments of Puglia found 59 animal species of Community interest (EU Directives 79/409 / EEC and 92/43 / EEC and subsequent amendments and supplements). In the same environment, Marzano *et al.* (2013) have emphasized the importance of ancient olive groves for many species of conservation interest (Tucker and Heath, 1994) and as trophic sites for many other species especially in winter. Moreover, as regards the olive groves of the Plain of Gioia Tauro and Rosarno, Scuderi (2014, personal communication) has highlighted the presence of a large avifauna.

Therefore, also within man-made environments such as agricultural ones, biodiversity depends in a fundamental way on the diversification of landscape and on the availability of environments that can meet the needs of the species during all stages of their life cycle (breeding sites, wintering sites, feeding areas). In both cases, olive groves are still well preserved in spite of the scarcely mechanized cultivation methods and the reluctance of farmers to innovation. Instead, spacing plantations are rather regular, especially where the slope conditions are very reduced. The plant density, even if varying because of the land orographic situation and of the soil fertility, is 40/80 plants per hectare in the most favorable cases, up to 90/120 in hilly areas (Mafrica *et al.*, 2008). Up to the point of insertion of the first branches, the trunk is very irregular and has numerous ribs; the largest branches are clearly erect and foliage develops in height.

Although of poor quality, the oil was stored at Gioia Tauro in warehouses and large cisterns that could hold up to 200,000 quintals; in years of good production these could empty and fill up twice. Later, by small boats the oil reached the close ports of Messina or Castellammare di Stabia and proceeded to the main European markets (England, Russia, Hamburg, Stettin, Marseilles, Romania and other Mediterranean Countries) where it was used for industrial purposes.

The most common cultivars were the "Ottobratica" and "Sinopolese" characterized by a long ripening period (from October to May); this gradual process was particularly important, because it did not require the storage of

olives or of olive oil. Moreover, drupes could be picked directly on the ground or by using the method of hand-pole beating. This harvesting system continued with few innovations until the middle of the last century, after the end of the Second World War, when the industrialization process affecting Italy caused the crisis of the traditional agricultural society in Mediterranean regions of which olive growing had always been the most typical expression.

Modern olive growing in the examined area

Since the Sixties of the last century, in the Plain of Gioia Tauro and Rosarno, a process of great agricultural transformation started affecting the traditional olive cultivation and management. At the beginning, this change regarded cultivation systems but, subsequently, led to the introduction of new crops that are modifying significantly the landscape of olive trees. Nowadays, there are a continuous reduction of the cultivation area of this species and its replacement with other ones, more profitable, such as citrus or kiwi. In some cases, this transformation proved to be irreversible, so that, especially in western lowland areas close to major roads, some traditional elements of identity of the Plain landscape have disappeared.

Nowadays, the serious crisis of olive growing in the Plain of Gioia Tauro and Rosarno is mainly attributed to the production of a low quality oil and to unfavorable ecological conditions in the central-western part of the Plain: high humidity, causing particularly virulent attacks of *Cycloconium oleaginum* (peacock eye) and *Gleosporium olivarum* (leprosy olive), favoring pathogenic attacks and therefore, an increase of oil acidity. The virulence and the frequency of attacks, above all when occurring at the beginning of the oil productive season, make it particularly difficult to carry out an effective plant health screening (Mafrica *et al.*, 2008). On the contrary, the old olive groves, located more inward in the foothills far from the sea and at slightly higher altitudes, at least partially have always been protected from the sub-mentioned diseases, even if recently the farmers of these areas record the presence of the olive fly, probably for an increase in air humidity.

Today, because of the continuous and rapid changes affecting the customs and traditions of agricultural world that “constitute” the peculiarities of an area and make it unique and unrepeatable, preserving the elements of territorial identity becomes very important. In the case of the Plain of Gioia Tauro and Rosarno, olive woods/forests represent a unique element with a great cultural and historical value that cannot be disregarded (Nicolaci *et al.*, 2007).

The maintenance of the historical memory of olive woods/forests and of the related structures for oil production still existing in the area (unfortunately, often in a situation of neglect) passes through a proper management that knows how to conserve the unique characteristics and enhance typical products. The management model to be adopted must be able to combine traditional methods

with current needs. It is certainly not an easy challenge, but it is the only tool with which it is possible to keep the identity of places and preserve historical and cultural traditions and, therefore, the peculiarities of the territory and landscape.

The current structure of olive woods / forests is the result of a series of constant interventions that have been carried out over decades and therefore, have allowed not only the constitution but also the perpetuation of a reality that everybody can still admire. The preservation and enhancement of this heritage is closely linked to the management, in other words to the rigorous and timely adoption of agricultural practices that have been handed down, with few variations, from one generation of farmers to another. On the one hand, the olive grove is a highly simplified system in its structure; on the other, it is also fragile and susceptible to any biotic or abiotic damage.

At the end of a conference held in Reggio Calabria on olive growing in Calabria, Paolo Inglese (1999) stated that traditional techniques are still used in a few areas and for this reason, they are even considered as a historical heritage of Italian agriculture. Above all in the South, typical olive plantations have become a peculiarity of the landscape: a great heritage also from the social and occupational point of view must be preserved and enhanced, in order to safeguard the territory itself.

The olive tree is considered the quintessential symbol of the Mediterranean landscape (Fichera *et al.*, 2002). Calabria, together with Puglia and Sicily, is one of the regions where this identity is very strong both for the extension of olive groves and for the quantity of produced oil. Indeed, olive growing and olive oil production have a centuries-old tradition that has built up over time an agricultural landscape of great cultural interest, preserving itself thanks to the care and passion of men (Fichera *et al.*, 2002). This landscape is the result of a balanced relationship between man and nature, the expression of the culture of people and of their interaction with the surrounding environment, for the use and protection of resources, and for the utilization of their land to satisfy their own exigencies.

Olive groves management

The conservation of the olive grove is linked to the use of the same cultivars; the replacement of plants occurs either for death or for a reduction of vitality. In these cases, it would be important to replace the plant as soon as possible and in the same place, in order to restrict competition of mature plants and to have all the space the new tree needs to grow in a harmonious way, thus avoiding the surrounding plants broaden their foliage and determine conditions of imbalance. In some cases, for the phytopathological defence of olive trees, a new planting may not be appropriate because natural vegetation is a particularly important habitat for the spread of predators helping to regulate the presence of some of

the most harmful insects for olive trees. Likewise, the "weeds" present along the roads or the difficult zones inside olive groves must be rigorously safeguarded. For each adult plant, all interventions will have to be carried out constantly according to local traditions, in particular, as regards pruning. In the case of trees showing signs of decay or exceptionally developed branches, an intervention of formative pruning can be adopted, without reducing the height of the plants.

In addition, from the ecological, biological, cultural and economic point of view, it is important to carry out a treatment of ground surface: two interventions each year (one immediately after the olive harvesting) that might facilitate the circulation of air and water in the soil, provide for water supplies used by plants during the summer, improve soil structure, promote the processes of organic matter decomposition and humus formation. Indirectly, these actions affect olive production and contribute to the phytopathological defence of the olive grove system, since the modification of the habitat in the upper layer of the soil helps to reduce the presence of harmful insects spending part of their life cycle just in the soil (olive moth).

Dealing with olive harvesting procedures, it is necessary to place nets at a certain height from the ground to avoid the fall and the ruin of olives. It is also possible to use mechanical methods (shaking machines properly designed and built for this type of plants; lift-trucks to allow workers to reach easily even the highest branches, etc..).

Olive harvest is one of the most characteristic and typical procedures that can be observed in the Plain and has always constituted an important opportunity for employment above all for women. It is an activity that retains all its charm, rich in history, therefore, it is important to pass on to the next generation these customs, repeating the same gestures.

The organization of guided tours for schools and tourists, describing the main stages of olive growing, of oil production and of olive sub-products preparation, may become opportunities for reconnecting man with nature and its flavors. These meetings should allow to spread a reality that is likely to be overwhelmed by scientific progress, to pass down traditions and customs that are an essential part of the land, to appreciate a product containing centuries of history and that can be considered as the emblem of the territory.

In this context, the recovery of ancient hypogeal olive oil mills and the rediscovery of traditional products can promote the area and enhance its traditions.

Discussion

Italian olive growing is characterized by a structural and economic crisis destined to increase for the progressive reduction of EU subsidies and for an even stronger international competition (Godini, 2011, 2010). In such a context,

the study has focused on the characteristics, evolution and possibilities of preserving, on limited surfaces, one of the most peculiar olive-growing landscapes in Italy. Nowadays, when small towns and local communities in rural and mountain areas are progressively disappearing under the pressure of globalization and products homogenization, the maintenance of "olive wood/forest" becomes a challenge which can be only won through the rediscovery of local knowledge - the *Traditional Ecological Knowledge* of Berkes *et al.* (1995)- true heritage, unique to each community. This is a bet that the local communities must accept and face daily, if they want to survive.

Indeed, the preservation of this heritage requires the constant presence of man. The assessment of this particular system can not be based on traditional methods referring to costs and benefits, as in the case of other olive growing systems mainly used for olive oil production. Undoubtedly, it must be extended to the goods and services provided by the system to the community with which it interacts, and summarized today by the definition of ecosystem services (MEA, 2005) as "multiple benefits provided by ecosystems to the human race". These are supply services (food, water, timber and fiber); services regulating the climate and rainfall, the water (eg. floods), the waste and the spread of disease; cultural services relating to beauty, inspiration and leisure that contribute to human spiritual well-being; support services, including soil composition, photosynthesis and nutrient cycling at the base of growth and production. The ecological services provided by olive groves go beyond national borders, seeing that, for example, they are home to migratory birds from northern Europe (Guzman Alvarez, 1999).

The idea that the values of nature, of environmental quality, of cultural heritage, can depend on agricultural practice is also based on the new concept of its multifunctional role, according to the "European model of agriculture" with benefits that are different from those linked only and merely to the food (Calabrese *et al.*, 2012).

The challenge also deals with organizing all these services in order to offer the society a system able to improve life conditions, being aware that the preservation and enhancement of small local villages with a variety of customs and traditions is the only way to safeguard the identity of places and of people who live there. The homologation to pre-established models, often unrelated to the story of the man who lives in these areas, would lead to the decay of local communities.

The value of ancient olive groves as agro-ecosystems lies not only in a certain level of biodiversity, but also in the fact that they become areas of intermediate levels of naturalness in which traditional, and / or extensive farming techniques with a low environmental impact are applied (Calabrese *et al.*, 2012).

The historical and cultural value of this landscape has generated much interest in the research community and, in particular, in some authors (Biondi *et al.*, 2007) who have suggested its inclusion in Annex I of the EEC Directive 92 / 43 as

priority habitats "Centuries-old olive groves" with evergreen *Quercus spp* and *arborescent Mattoral* (code 6320) as they answer the following parameters: a) are in danger of disappearance in their natural range of areas; b) become important examples of typical characteristics of one or more of the seven biogeographic regions (in this case, the ancient olive groves belonging to the Mediterranean region).

The maintenance of traditional olive groves on limited surfaces can represent what Greaves and Marshall (1987) define a field margin, in other words a structure of ecological value located in the peripheral area of a field that can not be monitored, becomes refuge for the arthropod and can be useful for preserving biodiversity near cultivated fields. In order to support production processes through the provision of environmental services, even the maintenance of appropriate ecological infrastructure ensuring biodiversity in agricultural areas (Calabrese *et al.*, 2012) may be useful to encourage and carry out important strategies for territorial development.

Summary

Nowadays, in different European areas, is particularly felt the risk of losing characteristic landscapes for socio-economic reasons, such as low profits for farmers and subsequent land abandonment. This is the case of the "Olives Forest" landscape of the Gioia Tauro and Rosarno plain in the Calabria region. The study examines the characteristics of the area marked by the presence of a secular forest of olive trees with large dimensions that can reach heights of 20 meters and diameters greater than one meter. Thanks to these distinctive features, these olive trees can be considered as real "natural monuments". This calabrian landscape is the only example of population with these characteristics grown on large areas, known worldwide so as to be universally recognized as "Olives Forest" and to constitute a symbol of the traditional olive cultivation in Calabria. Recently, some olive-oil producers, mainly large landowners, supported also by the local community, have expressed their interest in the possibility to maintain on limited surfaces, the typical landscape of the "Olives Forest" as a historical and cultural heritage of the community, as well as to restore the traditional techniques of cultivation and processing olive-oil inside of ancient rural buildings. In this context, the study examines some hypothesis to enhance the area and examine the possibility of establishing a protected landscape, as required by regional regulations regarding protected areas, or resort to the establishment of SIC area with the primary objective of conservation of this system as a tool for maintaining the identity of places and to start a socio-economic and cultural regeneration of the Plain of Gioia Tauro and Rosarno.

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