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Distribution, ecology and conservation of *Taxus baccata* (*Taxaceae*) in Sicily

Abstract

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Distribution and ecology of *Taxus baccata* in Sicily have been analyzed in order to evaluate its status with restoration purposes. Field surveys compared with historical information have shown that, even if this species became extinct since a long time in some areas of the island, the extant population on the Nebrodi mountains is expanding. This inverted process, following the foundation of the Regional Natural Park of Nebrodi, has clearly started soon after protection against grazing and other human activities has been acted in localities where *Taxus* occurs. The most important cause of extinction has therefore been identified in the cutting of trees practiced to prevent livestock poisoning, then, guidelines for conservation and restoration of *T. baccata* both in Sicily and in other Mediterranean regions subject to similar human pressure have been outlined.

Introduction

Taxus baccata L., occurring scattered and everywhere rare in most of Europe (Jalas & Suominem 1973) including Italy (Pignatti 1982), has became extinct in several regions especially at the margins of its range and such as several parts of the Mediterranean (cfr. Jalas & Suominem 1973). Among the main causes of the such rarefying, according to (Giacomini & Fenaroli 1958), there is that, since remote times this poisonous species has been consistently removed to protect livestock.

Also in Sicily, on the southern borderline of its range (that also includes the Atlas and Riff mountains in Morocco and Algeria on the West and Greece and Turkey on the East.), *T. baccata* there is rare and has became extinct in several large areas. Nevertheless the extant population has recently been observed in expansion.

In fact, noteworthy renewal has been observed in the sites where mature trees live and in their surroundings.

Here the results of a survey carried out with the aim to appreciate such process from the ecological and distributional point of view with conservation purposes are presented.

In Sicily *Taxus baccata* presently occurs only on the Nebrodi mountains, but in the past it was also found on the Madonie mountains and on the Etna mount as well (Fig. 1). There

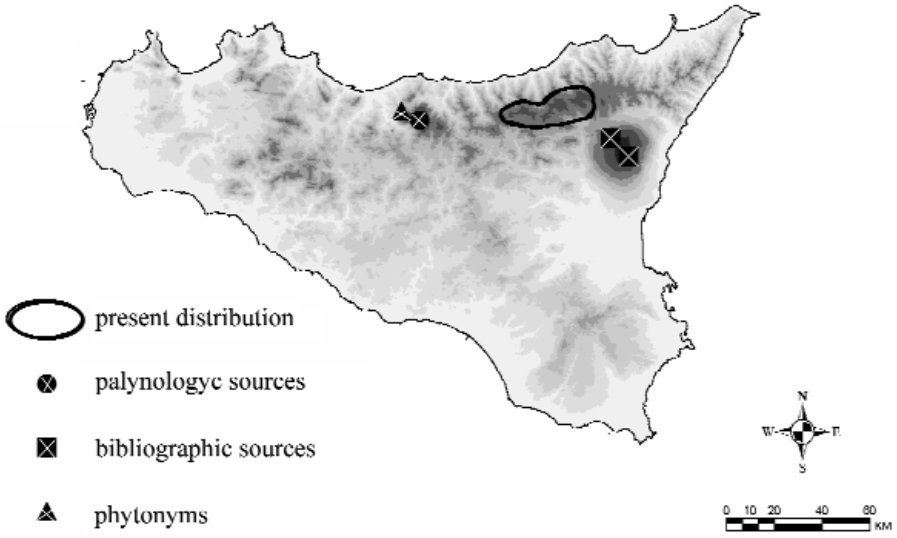

Fig. 1. Present distribution and evidences of the former occurrence of *Taxus baccata* in Sicily.

is palynological evidence that it occurred on the Madonie (Bertolani Marchetti & al. 1984) within *Fagus sylvatica* woods, but the only extant traces for the last two centuries, besides quite generic bibliographical and herbarium sources and some phytonyms, consist of some persistent vernacular names referring to some plants (*Euphorbia rigida*, "tassu", "Attassu") that are still used to poison ("attassari") watercourses for fishing (instead of *Taxus baccata*, whose practice is presently quite forgotten).

Regarding Etna most of the citations date back to Scuderi (1825) who charged the rarefying of the species to human activities. At the beginning of the XX Century *T. baccata* was still found between the Nebrodi mountains and the Etna (Baccarini 1901), but later it became extinct.

The fadeout of this species from the above mentioned areas is to be more or less directly referred to grazing. In fact, from the ecological point of view, no dramatic changes have affected the Sicilian concerned habitats during the last centuries and edaphic and climatic conditions are rather similar in the Nebrodi to those in Madonie and Etna. On the other hand, in the extant population living old individuals bear widespread signs of drastic cutting. Finally there are several individuals growing freely in the parks and gardens of Sicily.

Di Benedetto & al. (1983) and Gianguzzi & al. (1998) refer that up to 10 years ago *Taxus baccata* in the Nebrodi Mountains formed several isolated groups between 930 and 1450 m a.s.l. in localities now included in the A and B zones of the Natural Regional Park of Nebrodi. Inside each locality abundant and constant renewal were provided by mature *Taxus baccata* individuals. The vegetation aspects have been referred to a facies of the *Aquifolio-Fagetum* Gentile 1969 (in which *T. baccata* is treated as differential), and to the *Ilici-Taxetum baccatae* Brullo & al. 1995, described from the Nebrodi.

Except for a moderate use for boundary posts, the main source of disturb, increasingly heavy over the time, has been given by grazing and the need of removing that poisonous plant for horses and cows.

Material and methods

The *Taxus baccata* population in the Nebrodi mountains has been examined with respect to the conditions found in the last two decades (Di Benedetto & al. 1983; Gianguzzi & al. 1998; Ilardi & al. 2000) in comparison with the present ones. During field surveys carried out between May 2001 and May 2003 the range of *T. baccata* (Fig. 2) has been delimited by photointerpretation and subsequent ground check. For each site where *T. baccata* occurs, its location and extension have been recorded. In addition the location and the phyto-sanitary status of each old living individual found have been recorded. As far as renewal is concerned, it has been evaluated both in the surface including fully grown individuals and in external surrounding areas where only seedlings occurs. These latter areas represent the result of the spreading process. An approximate evaluation of such process has been established by computing the seedlings per surface unit both in the spreading and in the inner areas, comparatively. This, also taking into account that larger the area involved in the spreading process is, more important is the process itself. These counts were carried with accuracy in a single reference area, while the remaining localities have been surveyed only to verify possible expansion processes in each of them.

Results

As above specified, while it is generally accepted that *Taxus baccata* became extinct in the Madonie since several centuries, concerning Etna, all relevant literature (Di Benedetto & al. 1983; Gianguzzi & al. 1998; Ilardi & al. 2000; Nicotra 1878; Raimondo & al. 1994b, Lojacono, 1903; Strobl 188; Tornabene) refers to Scuderi (1825) and Cosentino (1830). In addition, no reliable material is kept in the Sicilian herbaria, apart from a single specimen by Tornabene (CAT!) bringing on the label no other information than the northern part of the Mount ('Plaga septemtrionalis'). This means that *T. baccata* became probably extinct on the Etna at least around the half of the XIX century.

The surveyed localities are: Tassita di Caronia, Bussonita, Poggio Tornitore, Urgo secco, Fiumetto Stream, Pracino Hillock, Spandente Stream, Biviere Lake, Scavioli Wood, Barrilà and Martello Streams, North of Serra del Re, Filicia Peak, Portella Scafi, Serra dei Ladri (Table 1 & Fig 2). Imposing stumps testifying the presence of several huge trees and the extent of the abuses aimed at eliminating *Taxus baccata* occur in each site (Fig. 3). Today the aversion of breeder against this species still persist but in lesser extent, and is possible to record a significant colonization of pastures and clearings from 850 m a.s.l. The spreading area in the locality "Urgo Secco" extending over 25 ha is occupied by seedlings 1 to 10 years old in number of 20 per 100 m^2 (Figs. 4 & 5). In the other *Taxus* localities the same expanding process is evident in various extent depending on the size of the surface at the starting point (about 1993) and on the ecological and morphological factors.

Table 1. Distribution of Taxus baccata in the Nebrodi mountains.

Site	Park Zones	Surface (ha)	Altitude m a.s.l.	old trees	renewal
Tassita di Caronia	A	35	1400-1550	yes	abundand
Bussonita, Poggio Tornitore	A	22	1200-1550	no	small
Barrilà and Martello streams	B	10	1100-1300	no	small
Catafurco gorge	B	2	900-1000	yes	abundant
Fiumetto stream	B	3	900-1000	no	no
Poggio Pracino	A, B	18	1100-1350	yes	abundant
Bosco di Scavioli	A, B, D	33	1200-1000	no	small
North of Serra del Re	A	9	1400-1550	no	small
Pizzo Filicia	A	3,5	1000-1150	no	no
Portella Scafi	A	4	1075-1450	no	no
Serra dei Ladri	B		900-1100	no	small
Spandente stream, Biviere lake	A	12	1300-1500	yes	abundant
Urgo secco	D	25	800-900	yes	abundant

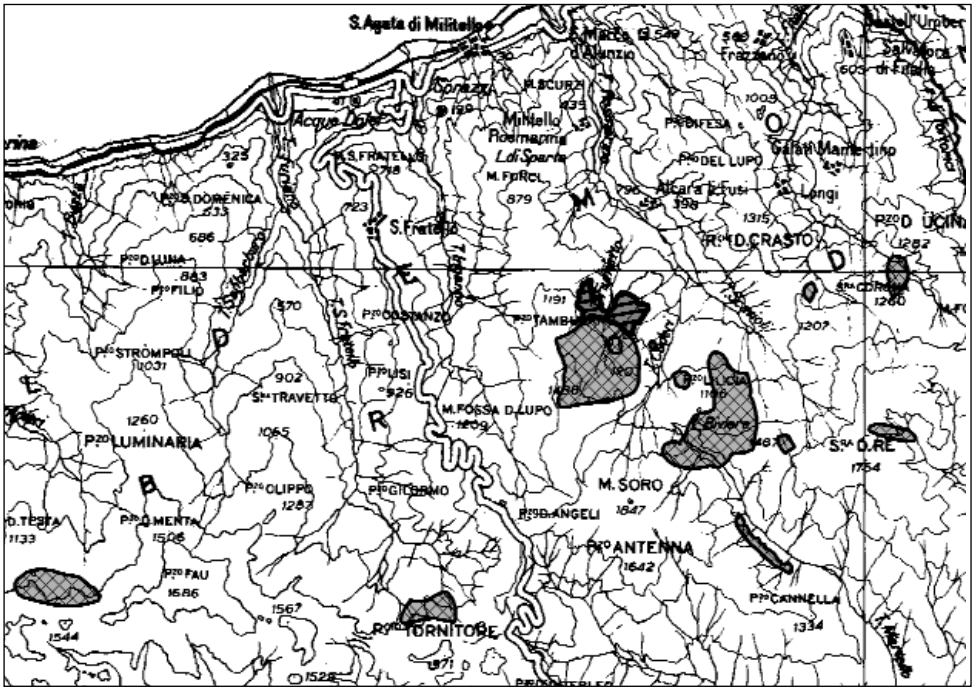

Fig. 2. Distribution of *Taxus baccata* in the Nebrodi mountains.

Fig. 3. A large individual damaged by cuttings.

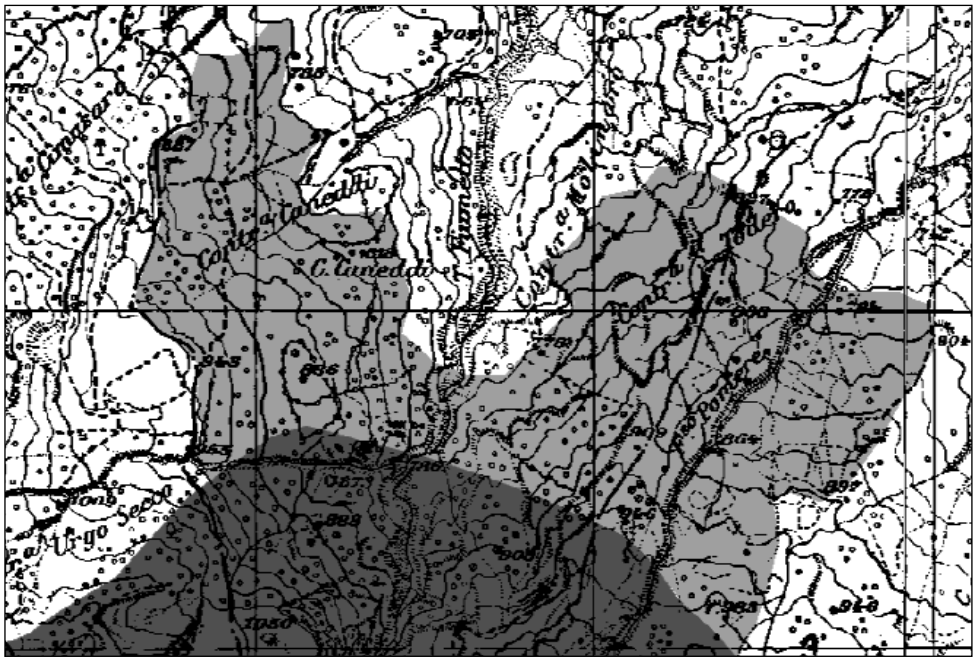

Fig. 4. The spreading area in the locality “Urgo secco” near Poggio Pracino.

Fig. 5. Seedlings of *Taxus baccata* in locality Urgo secco.

Discussion and conclusion

The new expanding process recently observed in the *Taxus baccata* population established on the Nebrodi Mountains is likely to be mainlt referred to the protection measures applied since the Natural Regional Park has been established in 1993 and in the following reduction of human activities. The control on the area performed by the management authority, even if rudimentary, has provided an effective barrier to the *Taxus* elimination by breeders and the reduction of the amount of livestock (about 1000 cows, 3500 sheeps and goats and 100 horses). This provision resulted sufficient to cause the numerical increase of seedlings forming more or less large expanding belts around the areas where mature trees lye. Under these new conditions *T. baccata* could be removed from the status Damaged (E) (Raimondo & al. 1994a) and considered not endangered

Taking into account the observed spreading of the population, the conservation strategies to be adopted for the *in situ* conservation on the Nebrodi Mountains and other localities subject to similar conditions, are outlined as follows:

– grazing interdiction in the area where *T. baccata* grows compensated by the improvement of pastures in compatible areas;
– grazing interdiction in the areas where seedlings colonization is more intense;
– preferential use of *Taxus baccata* in wood restorations, using seeds collected from local plants;

– tracking of spreading areas on the border of the surfaces presently occupied by fully-grown trees.

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