

Acta Bot. Croat. 46, 85—94, 1987.

CODEN: ABCRA2
YU ISSN 0365—0588

UDC 581.526.532 + 581.526.426.4(45) = 20

SPINY OAK (*QUERCUS COCCIFERA* s. l.)
COENOSSES OF THE OTRANTO COAST
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Received January 12, 1987

The Authors present the description of a spiny oak (*Quercus coccifera* s. l.) station near Otranto and propose a phytosociological interpretation connected to the local vegetational dynamism.

The coenosis is part of the degradation series of *Quercion ilicis* leading to *Oleo-Ceratonion* of secondary origin.

Introduction

The taxonomical problem concerning the spiny oak in general (Camus, 1936—38, Corti 1967, De Candolle 1984, Fiori 1923—29, Martinoli 1953, Oersted 1871—72, Rechinger 1943, Rikli 1943—48, Sabato 1972, Schwarz 1936—37, 1964, Wraber 1952, Zohary 1961, 1962, 1966, Gentile e Gastaldo 1976, Mariani-Colombo, Chiesura-Lorenzoni, Grigoletto 1983, Chiesura-Lorenzoni, Lorenzoni, Mariani-Colombo 1981) and in particular those found in the Apulia region is reflected by the problem of the formation of vegetation in a most notable way. In fact if this problem still remains open to doubt within the classification outline (Chiesura-Lorenzoni, Mariani-Colombo, Piccini 1979, Gentile e Gastaldo 1976), the spiny oak will present elements of *Quercus coccifera* L. and *Q. calliprinos* Webb (given that it concerns two different entities or only a sub-species or a variety of comprehensive *Quercus coccifera* s.l.) which are not always constant in terms of quality and quantity, oscillating between extreme combinations more similar to either entity; in that vegetation problem it's decided whether the coenoses, of which it forms a part, are allotted to the *Quercion ilicis* or the *Oleo-Ceratonion*.

In the first case it is possible to think of a resemblance to positions in the north-western Mediterranean and thus the *Cocciferetum* Br.-B1. 1924, and in the second case of a transformation towards the position in the Greek peninsula and the Aegeum.

In order to solve this problem, while other investigations into aspects of classifications are being carried out elsewhere, surveys have been started in various areas of Apulia, Murge and Salento in the last few years in an attempt to locate these positions, stand by stand, in the hope that a synthetic description both convincing and definite, can be attained.

Area of investigation

The place of study is situated south-east of Otranto (Fig. 1), constituting a remainder of an ancient »macchia« that used to cover the slope which, being partly very steep and partly slack and undulated, leans down on the sea.

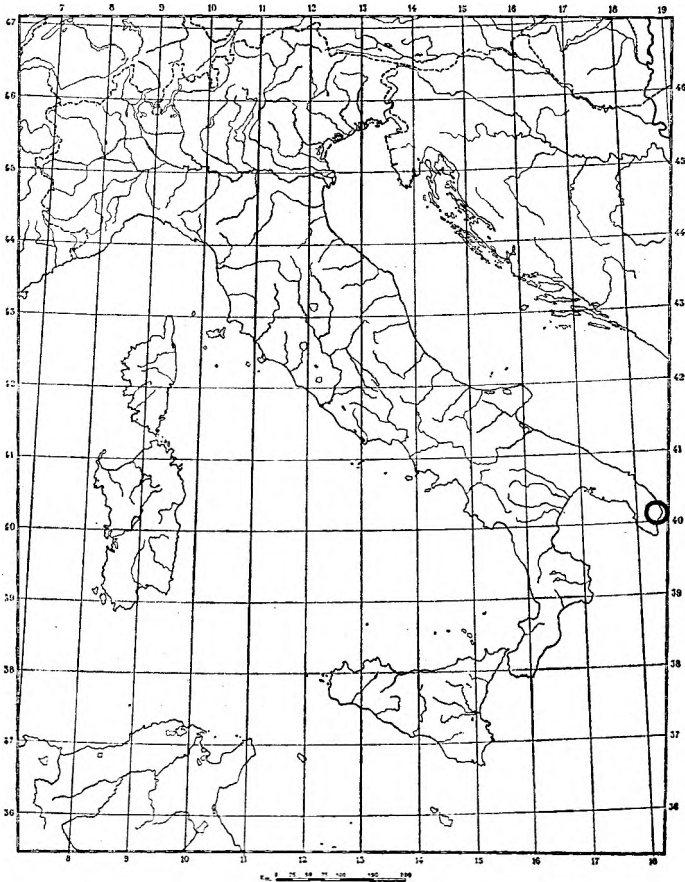


Fig. 1. Localization of the Otranto station (Salento — Southern Apulia).

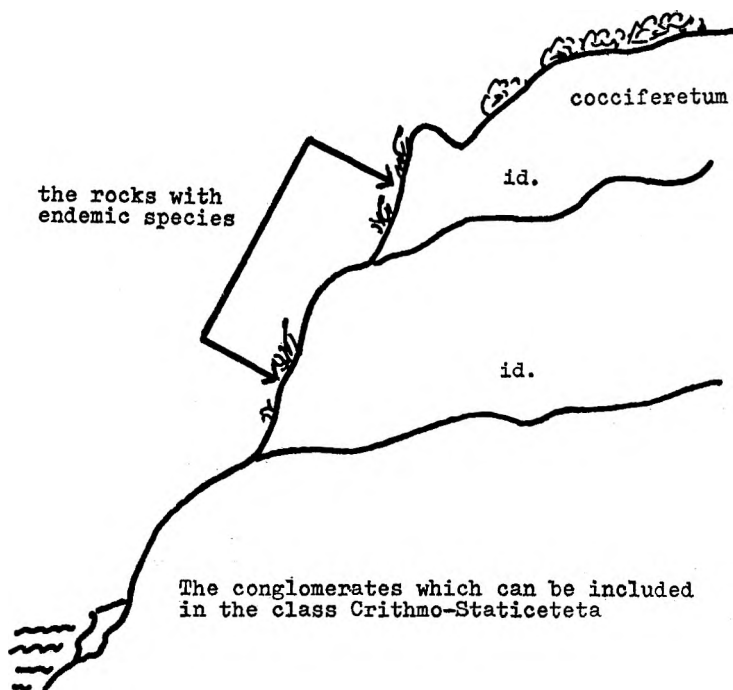


Fig. 2. Schematic representation of the region studied; particularly interesting are the relations that the vegetation with spiny oak has with the rocky population with many endemics and, inferiorly with the plan occupied by the *Crithmo-Staticeteta* class.

On the upper-level ground completely concealed by vegetation, spiny oak disappears and it can only be relocated a few kilometers inside the most inhospitable places along dry-stone walls (Chiesura-Lorenzoni et al. 1974), or in a circle of closed or well defined woods where it can take a tree-like shape.

At the place investigated the substrate is made of calcareous emergent rocks with layers of clay-soil stretching between. The adjacent craggy vegetation is rich in particularly interesting species such as *Campanula versicolor* Sibth. and Sm., *Scrophularia heterophylla* Willd. var. *fili-cifolia* Miller, *Alyssum leucadeum* Guss., *Centaurea leucadea* Lacaita, mostly endemic from Apulia or of no wider distribution (Fig. 2).

Its climate is typical of the coastline of Salento (see Francini-Corti 1966, 1967) whose occasional oscillation in microthermal sense are caused by the influence of northerly winds and in particular the »bora« whose last gusts (of wind) can still be heard.

Phytosociological situation

For a comprehensive discussion concerning phytosociology we have to refer to »Ricerche fitosociologiche sulle cenosi a *Quercia spinosa* del Salento (Puglia)« (Chiesura Lorenzoni et al. 1974) which consti-

Table 1. Species of *QUERCETEA ILICIS* Br.—Bl. 1947

Species of <i>Quercetea ilicis</i>			
<i>Quercus coccifera</i>	V	24	<i>Anemone hortensis</i> II +1
<i>Daphne gnidium</i>	V	+1	<i>Petrorhagia prolifera</i> II +1
<i>Asparagus acutifolius</i>	IV	+1	* <i>Calicotome villosa</i> II +1
<i>Carex distachya</i>	IV	+1	<i>Catapodium rigidum</i> II +1
<i>Myrtus communis</i>	IV	+1	<i>Lotus edulis</i> II
<i>Prasium majus</i>	III		<i>Ophrys bertolonii</i> II
<i>Rosa sempervirens</i>	I		<i>Foeniculum piperitum</i> II
<i>Pistacia lentiscus</i>	I		<i>Dorycnium hirsutum</i> II
<i>Cyclamen hederifolium</i>	I		<i>Urospermum dalechampii</i> II
<i>Olea sylvestris</i>	I		<i>Hymenocarpus circinnatus</i> II
			<i>Biscutella didyma</i> II
			<i>Narcissus serotinus</i> II
Other species			<i>Catapodium maritimum</i> II
<i>Brachypodium ramosum</i>	V	24	<i>Bellardia trixago</i> II
<i>Micromeria graeca</i>	V	+1	<i>Lathyrus cicera</i> II
<i>Urginea maritima</i>	V	+1	<i>Scabiosa maritima</i> II
<i>Teucrium polium</i>	V	+1	<i>Pallenis spinosa</i> II
* <i>Teucrium chamaedrys</i>	V	+1	<i>Scorpiurus muricatus</i> II
<i>Poa bulbosa</i>	V	+1	<i>Medicago lupulina</i> II
<i>Phlomis fruticosa</i>	V	+1	<i>Vicia ochroleuca</i> II
<i>Asphodelus microcarpus</i>	V	+1	<i>Trifolium angustifolium</i> II
<i>Cistus salvifolius</i>	V	+1	<i>Trifolium campestre</i> II
<i>Dactylis hispanica</i>	V	+1	<i>Dasypyrum villosum</i> II
<i>Plantago serraria</i>	V	+1	<i>Parentucellia latifolia</i> II
<i>Carex flacca</i>	V	+1	<i>Polygala nicaeensis</i> I +1
<i>Daucus carota</i>	V		<i>Ranunculus bullatus</i> I
<i>Cistus incanus</i>	IV	+1	<i>Serapias lingua</i> I
<i>Galactites tomentosa</i>	IV	+1	<i>Vicia antropurpurea</i> I
<i>Thymus striatus</i>	IV	+1	<i>Medicago litoralis</i> I
<i>Linum strictum</i>	IV		<i>Linum bienne</i> I
<i>Reichardia picroides</i>	IV		<i>Valerianella dentata</i> I
<i>Briza maxima</i>	IV		<i>Coronilla scorpioides</i> I
<i>Carlina corymbosa</i>	IV		<i>Centaurium erythraea</i> I
<i>Trifolium stellatum</i>	IV		<i>Hypericum triquetrifolium</i> I
<i>Dianthus sylvestris</i>	III	+1	<i>Plantago crassifolia</i> I
<i>Anthoxanthum odoratum</i>	III	+1	<i>Brachypodium distachyum</i> I
<i>Cynosurus echinatus</i>	III	+1	<i>Petrorhagia saxifraga</i> I
<i>Ornithogalum gussonei</i>	III		* <i>Thymus capitatus</i> I
<i>Anagallis foemina</i>	III		<i>Ranunculus muricatus</i> I
<i>Medicago minima</i>	III		<i>Trigonella foenum-graecum</i> I
<i>Eryngium campestre</i>	III		<i>Silene italica</i> I
<i>Hypochoeris achyrophorus</i>	III		<i>Avena fatua</i> I
<i>Arabidopsis thaliana</i>	III		<i>Picris hieracioides</i> I
<i>Scilla autumnalis</i>	III		<i>Evax pygmaea</i> I
<i>Tetragonolobus purpureus</i>	III		<i>Vicia hybrida</i> I
<i>Sherardia arvensis</i>	III		<i>Bellis annua</i> I
<i>Plantago coronopus</i>	III		<i>Silene alba</i> I
<i>Urospermum picroides</i>	III		<i>Blackstonia perfoliata</i> I
<i>Sanguisorba minor</i>	III		<i>Rhagadiolus stellatus</i> I
<i>Tuberaria guttata</i>	III		<i>Avellinia michelii</i> I
			<i>Medicago orbicularis</i> I

NB. The species of the class *Quercetea ilicis* are those that underlie the original Braun-Blanquet's definition. Other species, marked with* can be included in the class *Quercetea ilicis* too.

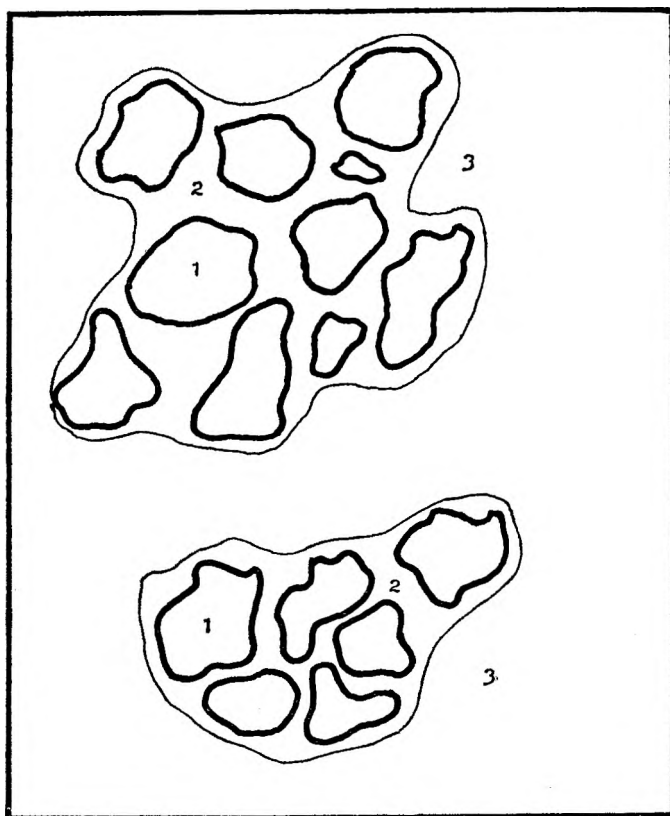


Fig. 3. Graphic representation of the problem of the entrance of other types of vegetation. This entrance brings many problems not only in the collection of the data but also in their interpretation.

- 1 — Big pillows with spiny oak
- 2 — »corridor« of herbaceous vegetation with elements of *Coccifera*
- 3 — *Thero-Brachypodietea*.

tute a first attempt, after the outline given in 1972 (Chiesura Lorenzoni et al. 1972) of phytosociological situation of coenoses of Salento: a description of all coenoses of the country in Caniglia et al. (1984).

As we have already hinted on several occasions, in observing the synthetic chart (Tab. 1) there is a remarkable scarcity of elements both of *Quercion ilicis* and *Oleo-Ceratonion* while there are plenty of herbaceous coenoses and particularly *Thero-Brachypodietea* (Fig. 3 and 4). This is to be attributed to an extreme degradation, whose reconstruction would not be feasible — even though it may be ecologically possible — because it is blocked by occasional fires and the force of strong sea-winds rich in salt.

Additionally it should be pointed out that these coenoses form a mosaic of thorn-oak-tree plates and of tree vegetation linked to it, by way of corridors of tree-vegetation which can be ascribed to *Thero-Brachypo-*

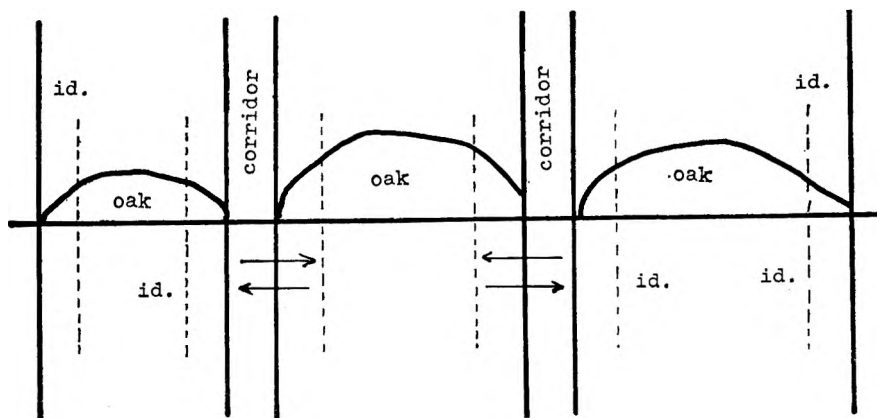


Fig. 4. Schematic representation of the outline of the relations between oak pillows and herbaceous vegetation.

dietae. Of course there is mutual pollution between the two positions which a long list of species is attributed to above all. Besides, in certain cases when the mosaic was narrow, extensive investigations should be carried out in the two positions, with a warning to the readers about this fact and inviting them to give less importance to the species which do not form the vegetational basis founded on spiny oak.

All of this goes to indicate the stage of extreme degradation of the original patch.

In the case of the vegetation under examination at Otranto the obvious comparison with *Cocciferetum* Br.-Bl. 1924: as mentioned above (Chiesura Lorenzoni et al. 1974) only *Quercus coccifera* L., *Teucrium chamaedrys* L. (perhaps ssp. *pinnatifidum* (Senne) Rech. fil.), are present here, while *Rumex intermedia* DC. is not.

It can be said that *Vincetoxicum nigrum* Moench, though absent here, perhaps due to the extreme degradation of the coenoses investigated it is indeed present in Salento in a degraded patch, where it is relatively scarce and can be ascribed to *Calicotomo-Myrtetum* Guinochet 1947. Anyway this does not appear to allow any definite attribution to the association of Braun-Blanquet, but it bears a striking resemblance to it. Furthermore it could be considered, in the context of a critical revision of the associations of *Quercion ilicis* in the Mediterranean basin, that there are two regional aspects of a unique group *Cocciferetum*.

An arrangement in a similar position to *Cocciferetum* Br.-Bl. 1924 is also suggested by the vegetational line. In fact, in Otranto and further south in S. Cesarea Terme, as well as in the Maglie zone the remains of pure holm-oak or mixed with *Quercus ilex* L., in the tree-layer dominated by *Q. coccifera* s.l., are common both to the tree-layer as well as the shrub layer; and these aspects of further evolved vegetation, even if this evolution, as mentioned, can only take place with some difficulty in the zone; the same *Cocciferetum* presents an abundance of *Brachypodium retusum* (Pers.) Beauv. (= *B. ramosum* (L.) R. et S.), a diff. species of the subass. *Quercetum ilicis galloprovinciale brachypodietosum* Br.-Bl. 1951 and characteristic of the degradation stage of »*Therobrachypodietum*« to be found in Otranto as well as in the south of France.

QUERCUS COCCIFERA-COENOSSES OF THE OTRANTO COAST

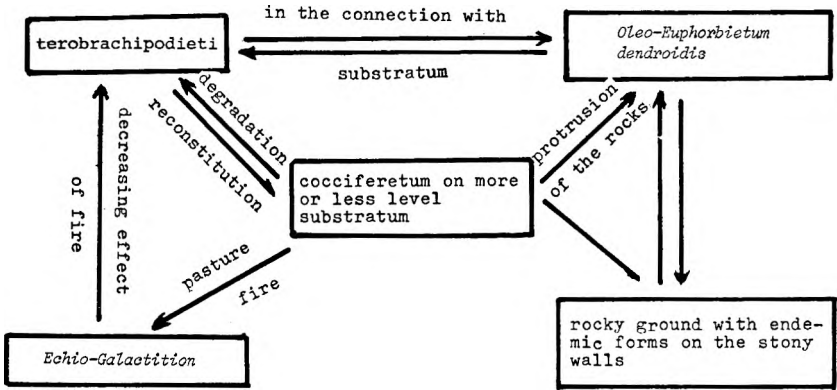


Fig. 5. Vegetation dynamism in Otranto: some relations are linked to the substratum, others to some events not linked to natural series. The relation between burning and pastures manifests itself, partially, in different ways from other places of the Mediterranean basin.

The position more towards the east and south of this locality in respect of the study by Braun-Blanquet (op. var.) and the presence in Salento of coenoses to be ascribed to *Oleo-Ceratonion* intrude, as we said, the problem in relation between *Quercion ilicis* and *Oleo-Ceratonion* (Fig. 5 and 6). In fact, aspects of *Oleo-Ceratonion*, though only secondary substitutes, are established in xerophile degradation associated with *Quercion ilicis* and they are quite common, as for example the timetes with *Thymus capitatus* (Curti, Lorenzoni, Marchiori 1976), association with *Poterium spinosum* and *Corydothymus capitatus* Lavrentiades 1966 and others.

In the high slopes in Otranto, among the more common species in *Oleo-Ceratonion*, *Thymus capitatus* (L.), Hoffm. et Link., *Myrtus communis* L. and *Prasium majus* L., have been found occasionally. These species are however characteristic of higher phytosociological units.

Observing this vegetation during various periods of the year, one gains a variety of impression owing to explosion in the blooming of the vegetation.

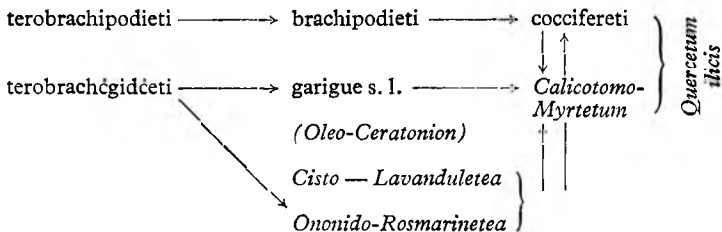


Fig. 6. Scheme of the evolution from *Therobranchypodieta* to *Quercus ilex* wood through *cocciferetum* and/or *Calicotomo-Myrtetum*. We can also notice the relations with two substitutive classes, *Cisto-Lavanduletea* and *Ononido-Rosmarinetea*, of which some characteristic species are present in the country.

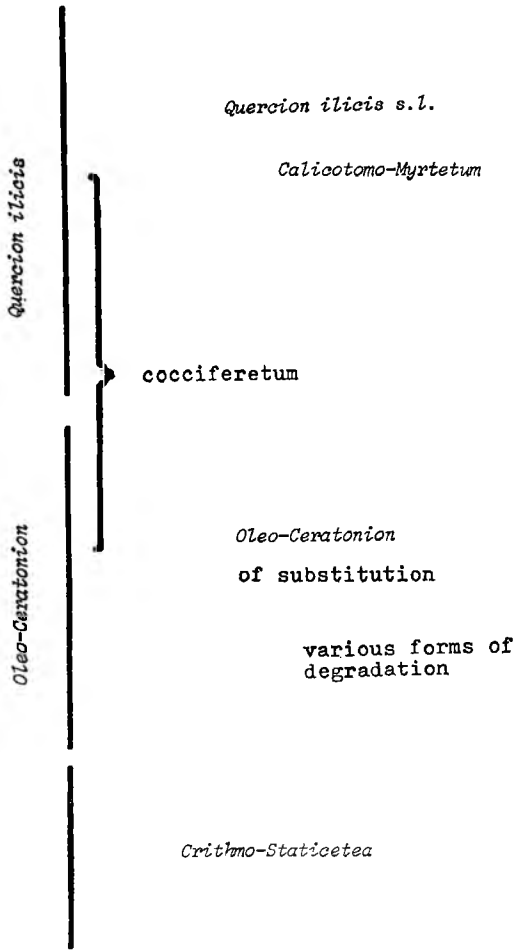


Fig. 7. Scheme of coenoses vertical sequence on the Otranto coast, and their relations.

Similarly, various stages of degradation often linked to substitutive *Oleo-Ceratonion* can be observed, in an interpretation founded on sigmassociations, we can attempt to arrange everything in *Oleo-Ceratonion*, without taking account of the dynamics and origin of the various situations.

Conclusions

With reference to the dynamic projects referred to, one can conclude that the coenoses of the spiny oak trees of the cliffs of Otranto (Fig. 8 and 9) can be arranged in a series similar to the one proposed by Br.-Bl. 1951, only a little more xero-thermophilic due to the different ecological



Fig. 8. View of the cliffs of Capo d'Otranto.



Fig. 9. A bush of *Quercus coccifera*, s. l. of the station of Otranto, after the fire in the winter of 1985—86.

and geographical characteristics. In practise this *cocciferetum* is a stage of extreme degradation very close to a *Brachypodietum* which belongs to the climatic zone of *Quercus ilex* L. united or substituted by *Q. coccifera* L. species of the more xeric zones (Chiesura Lorenzoni, Lorenzoni 1979). It's not however rare to witness a gradual slippage towards *Oleo-Ceratonion* in the warmest situations where are present *Thymus capitatus* (L.) Hoffm. et Link., *Daphne gnidium* L., *Calicotome spinosa* (L.) Link., *Olea europaea* L. var. *oleaster* Hoffm. et Link. (*silvestris* Hoffm. et Link.), *Ceratonia siliqua* L., etc.

Therefore we shall keep the opinion previously indicated (Chiesura — Lorenzoni, Curti, Lorenzoni 1972; Chiesura et al. 1974) that the *cocciferetum*, in this zone, is arranged between the high part of *Oleo-Ceratonion* and lower middle belt of *Quercion ilicis* in a position of extremely instable dynamism (Fig. 7).

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S a ž e t a k

ZAJEDNICE HRASTA OŠTRIKA (*QUERCUS COCCIFERA* s. l.) NA OBALAMA U PODRUČJU OTRANTA (LECCE — JUŽNI DIO PUGLIE — ITALIJA)

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Fitocenološko istraživanje pojedinih zajednica hrasta oštrika (*Quercus coccifera*) uz obalu otrantskog područja (južni dio Puglie) potvrdilo je ono što je već prije primijećeno u drugim područjima Puglie s obzirom na njihovu fitocenološku pripadnost.

Snimljene sastojine pokazuju, zapravo, jasnu tendenciju razvitka prema svezi *Quercion ilicis* više nego prema svezi *Oleo-Ceratonion*; ono isto što se događa u sjeverozapadnim područjima areala hrasta oštrika.

Smatra se, na temelju dinamičnosti vegetacije, da je to područje vrlo blisko ass. *Cocciferetum* Br.-Bl. 1924; čak mnogi degradacijski aspekti slijede »provansalsku« shemu s osobitom pojavom vrste *Brachypodium* izražene u subass. *brachypodietosum* Br.-Bl. 1951. unutar as. *Quercetum ilicis galloprovinciale*.

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