

Rare Oaks of the Riviera

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Since the glaciations, the richest flora in France has been found in the Mediterranean region. Considering only the oaks (genus *Quercus*), 9 of the 11 French species are found there. *Quercus coccifera* and *Quercus suber* are exclusively Mediterranean. *Quercus cerris*, whose presence is certainly linked to an introduction, also grows there, as does *Quercus ilex* and its *ballota* form. *Quercus pubescens*, *Quercus petraea* and *Quercus robur* are also present. *Quercus faginea* deserves particular mention, as one single small stand has been reported in France, close to the Spanish border. *Q. petraea* is quite infrequent, and *Q. robur* even rarer, but only two Atlantic oaks are absent from the area, *Q. suber* var. *occidentalis* and *Q. pyrenaica*.

Growing among these species in a small area between the Lion Gulf and the Italian border called the "French Riviera," a population of rare chance

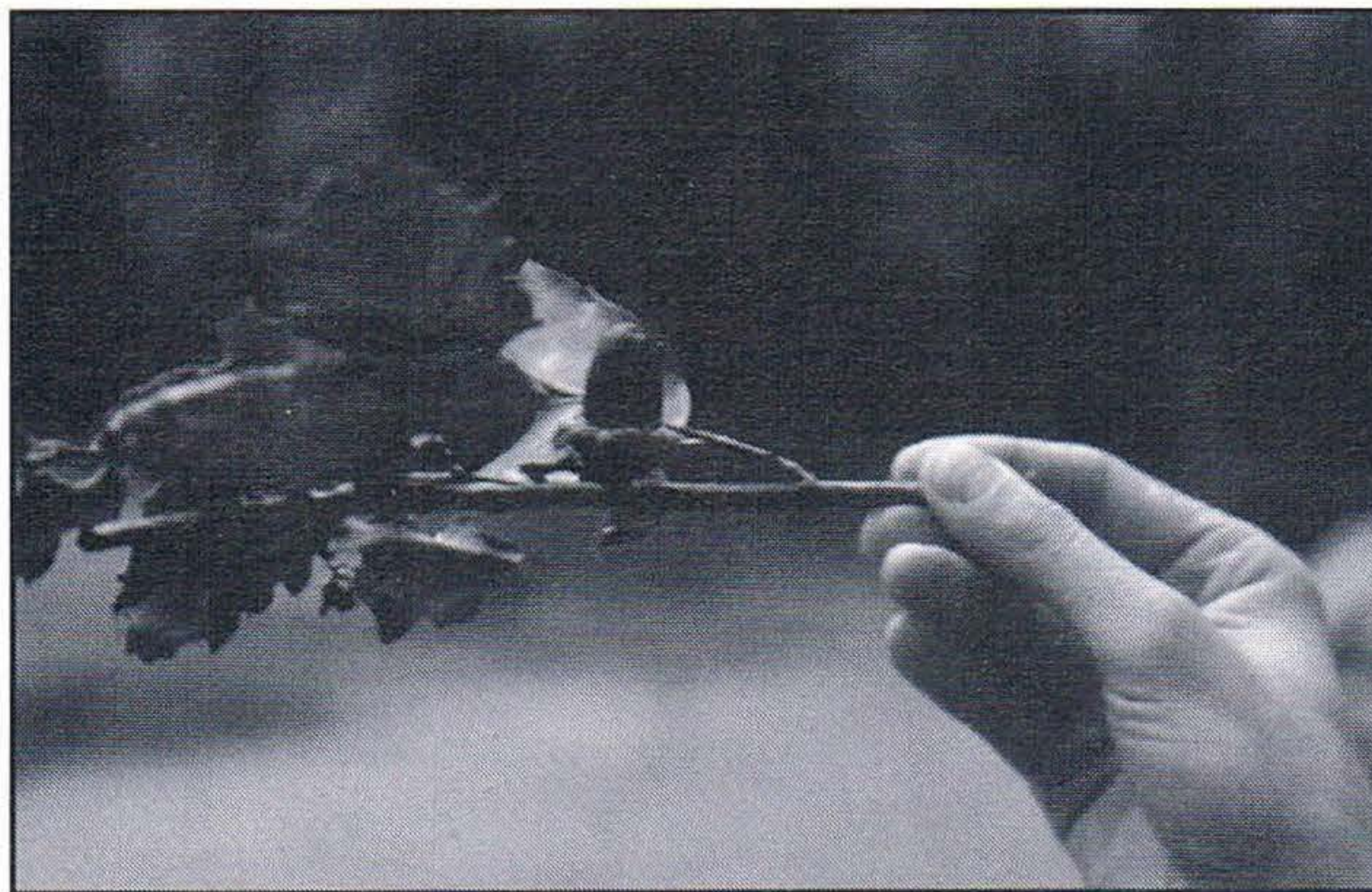


Photo by Th. Lamant

Quercus xhispanica Lam. (syn. *Q. crenata*) twig and acorn.

hybrids (= "essaim d'hybrides fortuits") can be found. Their origin is due mostly to the close cohabitation of the parents. Several of these hybrids are discussed below.

Quercus xhispanica Lam. (= *Q. pseudosuber* Santi, *Q. crenata* Lam., *Q. fontanesii* Guss.); false cork oak.

This hybrid between *Q. cerris* and *Q. suber*, is known in Great Britain as "Lucombe oak", from the Lucombe nurseries in Exeter which had collected acorns from *Q. cerris* in 1762.

Chorology:

Found only sparsely as isolated trees in the Var and Alpes maritime departments, the origin of these populations may be explained by the introduction of six plants in 1789 which later spread. These six original trees were derived from seeds and a few grafts obtained from the two trees first introduced to France. The high proportion of individuals borne from seeds may explain the variability in the foliage.

Around Saint Cassien Lake, a few beautiful two-centuries-old trees are growing with rather fastigate crowns and semi-deciduous foliage. At the photographed site, *Q. suber* is absent, but M. Barbero, R. Loisel and P. Ozenda mention it at other places around the lake. However, there are other locations where both parents coexists with the hybrid. Antoinette Camus, in her monograph of the genus *Quercus*, distinguishes two forms of the hybrid following the parentage. However, there is no categorical proof to back up this theory.

Q. suber pollinated by *Q. cerris*.

These trees reach 25 m in height, with an open crown of ascending branches. The upper part of the crown is rounded. The bark, at first smooth, becomes a pale brown-grey when older, forming many small non-suberous plates. The terminal bud is of a brown-reddish color, edged with scales, while the axillary buds lack them. The foliage does not remain until the spring, although sometimes a few brown leaves will



Photo by Th. Lamant

Quercus xhispanica Lam. (syn. *Q. Crenata*) near Saint Cassien Lake, Departement Var, France, with Yves Chalamel of Arboretum Vallauris.

cling unless the winter has been cold. The leaf blade is coriaceous, oblong-elliptic, 10 to 12 cm long by 3 to 4 cm wide, and is composed of 3 to 7 irregular lobes that end in a small spine. The sinuses are large and deep and the base is slightly rounded or heart-shaped. The color is a brilliant green on the upper leaf surface, and has a greyish tint beneath. Most of the time, only the midrib is hairy on the upper side. The petiole is 1/2 to 2 cm long. The lateral stipules are soon deciduous. The staminate flowers are borne in dense slender catkins 4 cm long and crimson in color before opening. The pistillate flowers do not exceed 2 mm long and are attached at the base of the terminal leaves on the current year's twig. They are solitary, rarely in pairs, supported by a 1 cm long peduncle and

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covered with a white flush. Additionally, they are edged with thin, numerous, imbricated red scales. Each flower has 4 to 6 styles. The acorns, rarely abundant, mature the second fall after flowering. They are held in a cup with a velvety inside, and many gray, prominent, and somewhat curved scales. This feature allows it to be distinguished from the cup of *Q. cerris*. The scales are shorter the closer they are to the peduncle. The cups measure 2.5 cm in length and 2 cm in diameter.

The trees observed close to the St. Cassien Lake are similar. What is striking about them is their fine slender trunk and the rather greyish and suberous bark, even if the cork layer is weak and of poor quality compared to *Q. suber*. The most handsome trees reach 2 m in circumference and 18 m in height. A group of three trees probably borne from the same trunk are 1.6 m in diameter and 14-m tall.

Distinguishing features:

The dense flush of the young twigs and the underside of the leaf, as well as its grayish and somewhat suberous bark, allow it to be differentiated from *Q. cerris*. The leaf is also more



Photo by Th. Lamant

Quercus xhispanica Lam. (syn. *Q. Crenata*) tree at Saint Cassien Lake, Departement Var, France.

coriaceous and larger, and the axillary buds do not have any scales. It differs from *Q. suber* in being semi-evergreen and deciduous.

Q. cerris pollinated by *Q. suber*

This description is quite similar to the previous one, except for the following features. The hybrid is sometimes more shrubby, with dark grey bark sinuated with dark cracks isolating non-suberous smooth plates. The bark is seldom of a yellow-grey colour, thinly cracked and suberous as in the first type. Its crown is narrower and reminiscent of *Q. ilex* in its dense and tortuous ramification.

The foliage remains during the hardest winter months until the development of new leaves in May or June. The leaf blade is smaller, measuring from 4 to 6 cm long by 2 cm wide. The 4 to 5 lobes are triangular with small spines. The spring color is silvery white.

The blooming of both types occurs in April and May and they bear fruit from September to December the following year. The seeds are disseminated by rodents. The root system is generally deep. However, the hypothesis of two distinct types following the parentage is often debated, and it is possible that there might

be only one hybrid with a strong morphological diversity.

Ecology :

Q. xhispanica grows mostly under 500 m in altitude, often in deep fresh clay, sandy soils or slightly acid to weak active calcareous soils. It does not do well in too dry soils or superficial ones, and will be found in regions with high rainfall and hygrometry. It is hardy to European zone 6 (from - 17 °C to - 23°C). At St. Cassien Lake, it grows associated with *Q. suber*, *Q. ilex* and *Q. pubescens*, but *Q. cerris* is completely absent, suggesting that the hybrid was introduced. *Q. x hispanica* also grows associated with *Ostrya carpinifolia*, *Pinus pinaster*, *Phillyrea angustifolia* and *P. media*, *Paliurus aculeatus*, *Cornus sanguinea*, *Rhamnus alaternus*, and *Cistus salviifolius*. In other sites, it grows close to *Q. cerris* but without *Q. suber*.

***Quercus xmorisii* Borzi**

(= *Q. x mixta* Villalobos, *Q. x bertrandii* Albet & Reyn, *Q. hispanica* Colm & Bout):

This very rare oak, described in 1880, is a hybrid between *Q. ilex* and *Q. suber*.

Description :

This small tree measures 5 to 20 m in height and has a crown aspect similar to *Q. ilex*. The young shoots are densely white. The foliage is lanceolate, oblong-ovate or oblong-lanceolate. The leaf blade has a rounded or cordate base, seldom cuneate, with a sharp end. It measures 3 to 5 cm long, with a glabrous upper surface covered with a white flush beneath. The blade is edged with mucronate lobes, but only from its middle to its top. The veins of the lower face are prominent. The stalk reaches a fifth of the whole blade length. The male catkins bear 4 to 5 slightly pubescent anthers. The pistillate flowers are held on a 1- to 2-cm long tomentose stalk. The acorn matures in one year and is half enclosed in a cup that has a

velvety inside. The cup has a flattened bottom and densely velvety, obtuse ovoid scales, which are closely appressed and erect, but longer than in *Q. ilex*.

Distinguishing features:

The foliage reminds one much of *Q. suber*, but the lower leaf surface is only slightly pubescent. The cups have the hemispheric shape of *Q. ilex* but are clearly less fringed than those in *Q. suber*. Bark observation is determinant for this hybrid: it is not suberous as for *Q. suber*, but thick, smooth, and above all, deeply cracked into large plates with more or less recurved edges. Because of this, the bark is not similar to that of *Q. ilex*.

Chorology:

A specimen is located next to St. Cassien Lake, not far from the *Q. xhispanica* station. It grows in a cool and shaded thalweg (valley) on the northern slopes, associated with *Q. ilex*, *Q. xhispanica* and *Castanea sativa*. It has also been located in the Var department as a multiple-trunk example, associated with *Q. ilex* and *Q. suber*, which were found close to the hybrid this time. The hybrid has also been located next to Parpaillon, Var Department, and also near Santa Lucia, Bastia, in Corsica. These last observations should be checked, since the reports are 50 years old.

Ecology:

Its distribution depends directly on the ecological needs of one of the parents, *Q. suber*. This hybrid is not suitable for chalky soils. *Q. x morisii* will be found upon a silice, gneiss or shists, and also soils of granitic origin. It grows associated in particular with *Castanea sativa*, *Erica arborea* and *Arbutus unedo*.

***Quercus xauzandri* Gren. & Godr.**

(= *Q. auzendi* Gren. & Godr. , *Q. ilex* var. *agrifolia* DC. , *Q. xcatalaunica* Sennen,

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Quercus airensis Franco & Vasc., *Q. coccifera* ssp. *auzandri* Batt. & Trabut.

This oak, described in 1855, is a hybrid between *Q. coccifera* and *Q. ilex*. It is rare, although it is more frequent where the two parents grow together.

Description:

Its dimensions and crown habit are reminiscent of both *Q. coccifera* and *Q. ilex*. In the first case, it can be a small, dense, bushy shrub never growing above 2-m tall, while it can also take the aspect of a tree or shrub with dimensions of 10 - 15 m in height in the second case. The leaf is coriaceous, oblong and attenuated at the two ends, with a wavy margin and a few pointed prickly lobes, glossy on the upper side and covered with a sparse or continuous tomentum beneath. The acorns mature in one year. They are of an ovoid - oblong obtuse

form, in a cup that covers two fifths of the acorn base. The cup itself is rounded at its base and bears sharp lanceolate scales, light tomentose and appressed, slightly uneven on their upper side.

Distinguishing features:

This hybrid has extremely variable leaves, like *Q. ilex*, and sometimes even resembles that parent. The lateral twigs are not divaricated (that means, inserted at right angles) like *Q. coccifera*, but rather ascending similar to *Q. ilex*, sometimes even drooping. The leaves are always more or less covered with a starry tomentum beneath, in contrast to *Q. coccifera*, whose leaves are greenish underneath. Also, and this is a very helpful clue, they have a distinctive character most often lacking in *Q. ilex*: the veins end in a prominent prickle like *Q. coccifera*. The cups are similar to those of

Q. ilex. However, the scales of *Q. x auzandri* are longer, larger, and their tip is generally more or less divergent and never appressed against the cup.

Chorology:

This hybrid has also been mentioned in other places in the Var department. Some examples with shorter cups, sharper acorns and truncate or emarginate leaves have been described next to Maraval. A tree with little rounded and mostly oval leaves has been observed



Photo by Th. Lamant

Quercus xauzandrii Gren. and Godr. (syn. *Q. auxandrii*) herbarium specimen from Cadolive, Departement Bouches du Rho. Specimen courtesy of Pierre Lieutaghi.

next to St. Zacharie. Other specimens have more recently been found in the neighboring departments, next to Cap d'Antibes, in the Bouches-du-Rhône, Vaucluse, Provence Alps.

Ecology:

This oak, like *Q. coccifera*, grows in dry, warm bushy formations called "guarrigues" (with a more or less compact and calcareous soil) together with *Pinus halepensis* and sometimes only *Q. ilex*. In other localities, it grows in warm, dry rocky places with good light. It is interesting to note that *Q. coccifera* has not been confirmed everywhere the hybrid is found. Associated plants are *Phillyrea angustifolia* and *P. media*, *Lonicera implexa*, *Rhamnus alaternus*, *Rosmarinus officinalis*, *Cistus albidus*, *Viburnum tinus* and *Pistacia teribenthus*.

Finally, we are still in search of examples of *Quercus. xalbescens* A. Camus (*Q. ilex* x *Q. pubescens*), described by Antoinette Camus in her monograph of the genus *Quercus* at the beginning of the century. This hybrid was mentioned as occurring at a location in the Maritime Alps.

Description:

The twigs are densely tomentose but become glabrous at the end of the season. The buds are equally hairy but bear more scales than *Q. ilex*. The semi-deciduous foliage is characterized by small short-stalked leaves (stalk 0.3 to 1 cm long), of an obovate form with rounded or obtuse tips and a truncate or somewhat rounded base. The leaf blade measures 4 to 7 cm long by 2 to 3 cm wide, with thick texture (except when young) and is edged with coriaceous and often mucronate teeth, at the end of the veins. The teeth in the middle of the leaf are sometimes slightly lobed. The middle vein is rather prominent.

These chance hybrid populations have no genetic stability, as the second generation's diversity is increased by backcrosses with the parents. Their future is strictly linked to their

ability to fit their environment, in particular to a strong initial growth. Most often these chance hybrids are not favoured by the selective pressure of nature. If ever they would persist and become well adapted to their environment, these hybrids could become true species (as in the example of *Abies borisii-regis*, borne from an introgressive zone between *A. alba* and *A. cephalonica*).

Conclusions

The Mediterranean forest has been strongly degraded by human intervention. But Man is also sometimes responsible for causing hybridization by inducing artificial cohabitation between two species. Unfortunately, the Mediterranean hybrids are still poorly known and the botanical descriptions do not always match from one book to another. As usual, careful field observations often reveal the distinguishing features of these hybrids. However, the extreme foliar diversity of *Q. ilex* (one of the parents of these hybrids), influenced partly by various conditions of climate and site, make the identification of the hybrids difficult. In spite of this, the main difficulty is the chorology. An enormous effort of inventory should be undertaken, followed by measures of preservation at least for the most endangered trees. A few people are working for that purpose. Pierre Leuthaghi is one of these and thus deserves great thanks.

The Mediterranean forest is fragile and threatened. The knowledge of rare hybrids, their preservation, and multiplication in specialized collections or as small forest stands could help, in a way, protect it. If these hybrids are to become efficient (that means, well adapted to their environment), it would be interesting to promote them and recreate the Mediterranean forest that Man helped destroy.

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Table 1. Comparative features of *Q. x hispanica* and its two parents.

Species	Features							
	Habit	Bark	Twig	Bud	Leaf	Fruit	Maturity	Ecology
<i>Q. suber</i>	Tree >20 m, open crown rounded	suberous and very thick	hairy	tomentose	evergreen, margins wavy and armed, dark green glabrous above, tomentose grey bluish below	solitary or on pair, short stalk, scales villous & erected, acorn half enclosed in the cup	one year	not chalky soils, high hygrometry
<i>Q. cerris</i>	Tree >35 m, large crown rounded	dark grey with greyish longitudinal ridges separated with orange deep fissures	brown and hairy	brown, sharp with long scales	deciduous, very coarsely toothed or lobed, glabrous above, hairy below becoming glabrous	solitary or till 4, very short stalk, scales villous & curved, acorn half enclosed in the cup	two years	neutral, loamy, chalky soils & calcareous sands
<i>Q. x hispanica</i> (= <i>Q. suber</i> x <i>Q. cerris</i>)	Tree >25 m, open crown rounded	Dark grey and somewhat suberous	reddish-brown & very hairy	Brown, with long scales only on terminal buds	subevergreen, tough, nearly glabrous above, tomentose below	solitary or in pair, short stalk, scales tomentose, acorn half enclosed in the cup	two years	loamy, sandy soils, without active chalk, high hygrometry

Table 2. Comparative features of *Q. x morisii* and its two parents.

Species	Habit	Bark	Twig	Bud	Leaf	Fruit	Maturity	Ecology
<i>Q. ilex</i>	Tree >20 m, densely branched, globose or ovoid crown	longitudinally furrowed in little thin scaly grey dark plates	greyish, hairy when young becoming more or less hairy	little & globose	evergreen, tough, more or less remotely toothed, dark green shiny & glabrous above, greyish tomentose below	solitary or till 3, short stalk, short appressed tomentose scales, acorn nearly half enclosed in the cup	one year	limestone to sandstone
<i>Q. suber</i>	Tree >20 m, open crown rounded	suberous and very thick	hairy	tomentose	evergreen, margins, wavy and armed, dark green glabrous above, tomentose grey bluish below	solitary or on pair, short stalk, scales villous & erected, acorn half enclosed in the cup	one year	not chalky soils, need high hygrometry
<i>Q. x morisii</i> (= <i>Q. ilex</i> x <i>Q. suber</i>)	shrub or little tree (5 to 20 m)	thick, deeply furrowed in large plates with more or less curved edges	densely white tomentose when young	petits et tomenteux	evergreen, glabrous above, white tomentose below, upper half with toothed margin	solitary, short stalk, long appressed tomentose scales, acorn half or more enclosed in the cup	one year	calcifuge, silice, gneiss, shists & granitic origin soils, need high hygrometry

Table 3. Comparative features of *Q. x auzandri* and its two parents.

Species	Features							
	Habit	Bark	Twig	Bud	Leaf	Fruit	Maturity	Ecology
<i>Q. ilex</i>	Tree >20 m, densely branched, globose or ovoid crown	longitudinally furrowed in little thin scaly grey dark plates	Greyish, hairy when young becoming more or less hairy	little & globose	evergreen, tough, more or less remotely toothed, dark green shiny & glabrous above, greyish tomentose below	solitary or till 3, short stalk, short appressed tomentose scales, acorn nearly half enclosed in the cup	one year	limestone to sandstone
<i>Q. coccifera</i>	bushy shrub, 0.5 to 4 m, densely branched	grey dark & smooth	Tough, often divaricated, greyish & hairy	brown & ovoid	evergreen, little, coriaceous, margin very spiny, glabrous & shiny on both faces	solitary, short stalk, sharp lanceolate & erected scales, acorn more than half enclosed in the cup	two years	warm, dry and compact chalky soils
<i>Q. x auzandri</i> (= <i>Q. ilex</i> x <i>Q. coccifera</i>)	Bushy shrub > 2 m or small tree > 15 m	indifferently like one or the other of the 2 parents	hairy, erected or drooped but never divaricated	brown & ovoid	evergreen, margin slightly toothed, glabrous above & more or less tomentose below	solitary, short stalk, long scales never appressed, acorn more than half enclosed in the cup	one year	warm, dry and compact chalky soils

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