

Mapping Mediterranean tree species from published references and databases: challenges and outcomes.

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منظمة
الأغذية والزراعة
للأمم المتحدة

联合国
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Food and Agriculture
Organization of the
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Organisation des
Nations Unies pour
l'alimentation et
l'agriculture

Продовольственная и
сельскохозяйственная
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Объединенных Наций

Organización de las
Naciones Unidas para la
Alimentación y la
Agricultura



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The context: 24 forest tree species of importance for Mediterranean forestry

« Optimiser la production de biens et services par les écosystèmes boisés méditerranéens dans un contexte de changement globaux »



- ⇒ Populations in pilot sites vs General distribution of the species
- ⇒ Identify the situation of pilot sites for geographical marginality.
- ⇒ Implement specific management for FGR.

How to create maps of Mediterranean trees? The species list

=> List of 24 species based on 7 pilot sites in 5 countries (including CHREA and BARBARA)

| Scientific Name | Scientific Name |
|--|-------------------------------|
| <i>Acer hyrcanum subsp. tauricolum</i> | <i>Pinus halepensis</i> |
| <i>Arbutus unedo</i> | <i>Pinus nigra</i> |
| <i>Cedrus atlantica</i> | <i>Pinus pinea</i> |
| <i>Cedrus libani</i> | <i>Pistacia lentiscus</i> |
| <i>Chamaerops humilis</i> | <i>Platanus orientalis</i> |
| <i>Ilex aquifolium</i> | <i>Quercus coccifera</i> |
| <i>Juniperus drupacea</i> | <i>Quercus cerris</i> |
| <i>Juniperus excelsa</i> | <i>Quercus ilex</i> |
| <i>Juniperus oxycedrus</i> | <i>Quercus canariensis</i> |
| <i>Juniperus phoenicea</i> | <i>Quercus suber</i> |
| <i>Laurus nobilis</i> | <i>Taxus baccata</i> |
| <i>Pinus brutia</i> | <i>Tetraclinis articulata</i> |

| Species name (in pilot site) | Accepted name (in Catalogue of Life) | COMMON NAME/NOM COMMUN | DUZLERCAMI TURKEY | DJELFA ALGERIA | CHREA ALGERIA | JABAL MOUSSA LEBANON | MAAMORA MOROCCO | BARBARA TUNISIA | SILIANA TUNISIA |
|------------------------------|--|--|-------------------|----------------|---------------|----------------------|-----------------|-----------------|-----------------|
| Acer tauricum | Acer hyrcanum subsp. tauricum (Boiss. & Balansa) Yalt. | Taurus Maple/Érable du Taurus | | | | X | | | |
| Arbutus unedo | Arbutus unedo L. | Strawberry tree/Arbousier | | | X | | | | X |
| Cedrus atlantica | Cedrus atlantica (Endl.) Manetti ex Carriere | Atlas Cedar/Cèdre de l'Atlas | | | X | | | | |
| Cedrus libani | Cedrus libani A. Rich. | Cedar of Lebanon-Taurus Cedar/Cèdre du Liban | X | | | | | | |
| Chamaerops humilis | Chamaerops humilis L. | Mediterranean dwarf palm/Palmier nain | | | X | | X | | |
| Ilex aquifolium | Ilex aquifolium L. | Holly/Houx | | | X | | | | |
| Juniperus drupacea | Juniperus drupacea Labill. | Syrian juniper/Genévrier de Syrie | | | | X | | | |
| Juniperus excelsa | Juniperus excelsa M.-Bieb. | Greek juniper/Genévrier grec | X | | | | | | |
| Juniperus oxycedrus | Juniperus oxycedrus L. | Prickly juniper/Genévrier oxycèdre | | X | X | | | | |
| Juniperus phoenicea | Juniperus phoenicea L. | Phoenician juniper/Genévrier rouge | | X | | | | | |
| Laurus nobilis | Laurus nobilis L. | Bay laurel/Laurier noble | | | X | | | | |
| Pinus brutia | Pinus brutia Ten. | Turkish pine/Pin de Calabre | X | | | X | | | |

| Species name (in pilot site) | Accepted name (in Catalogue of Life) | COMMON NAME/NOM COMMUN | DUZLERCAMI TURKEY | DJELFA ALGERIA | CHREA ALGERIA | JABAL MOUSSA LEBANON | MAAMORA MOROCCO | BARBARA TUNISIA | SILIANA TUNISIA |
|-------------------------------|--|---------------------------------|-------------------|----------------|---------------|----------------------|-----------------|-----------------|-----------------|
| <i>Pinus halepensis</i> | <i>Pinus halepensis</i> Mill. | Aleppo pine/Pin d'Alep | X | X | X | | | X | X |
| <i>Pinus nigra</i> | <i>Pinus nigra</i> J.F. Arnold | European black pine/Pin noir | | | | | | | |
| <i>Pinus pinea</i> | <i>Pinus pinea</i> L. | Stone pine/Pin pignon | X | | | | | X | |
| <i>Pistacia lentiscus</i> | <i>Pistacia lentiscus</i> | Mastic tree/Lentisque | | X | X | | X | X | X |
| <i>Platanus orientalis</i> | <i>Platanus orientalis</i> L. | Oriental plane/Platane d'Orient | X | | | X | | | |
| <i>Quercus calliprinos</i> | <i>Quercus coccifera</i> L. | Kermes oak/Chêne kermès | | | | X | | | |
| <i>Quercus cerris</i> | <i>Quercus cerris</i> L. | Turkey oak/Chêne de Turquie | | | | X | | | |
| <i>Quercus ilex</i> | <i>Quercus ilex</i> L. | Holm oak/Chêne vert | | X | X | | | | X |
| <i>Quercus mirbeckii</i> | <i>Quercus canariensis</i> Willd. | Algerian oak/Chêne Zéen ou zen | | | X | | | X | |
| <i>Quercus suber</i> | <i>Quercus suber</i> L. | Cork oak/Chêne liège | | | X | | X | X | X |
| <i>Taxus baccata</i> | <i>Taxus baccata</i> L. | European yew/If | | | X | | | | |
| <i>Tetraclinis articulata</i> | <i>Tetraclinis articulata</i> (Vahl) Mast. | Barbary thuja/Thuya de Berberie | | | X | | | | |

How to create maps of Mediterranean trees and shrubs? Managing synonymy and vernacular names

a – The Plant List (<http://www.theplantlist.org/>)

The Plant List is a working list of all known plant species.

b – Catalogue of Life (<http://www.catalogueoflife.org/>)

The Catalogue of Life is the most comprehensive and authoritative global index of species currently available.

Example: *Quercus mirbeckii* / *Q. canariensis*



| Species name in pilot site | (27) SYNONYMS in Catalogue of Life | Accepted Name in Catalogue of Life |
|---|---|--|
| <p>Quercus mirbeckii (chêne zéen)</p> | <p>Quercus baetica (Webb) Villar; Quercus canariensis Willd.; Quercus canariensis var. carpinifolia; Quercus canariensis var. mirbeckii; Quercus canariensis var. salzmänniana; Quercus carpinifolia Sennen; Quercus corymbifolia Ehrenb. ex Boiss.; Quercus cypri Kotschy ex A.DC.; Quercus esculenta K.Koch; Quercus faginea var. baetica; Quercus faginea subsp. baetica; Quercus faginea var. salzmänniana; Quercus faginea var. spinosa; Quercus gibraltarica K.Koch; Quercus infectoria subsp. mirbeckii; Quercus lusitanica var. baetica; Quercus lusitanica var. fagifolia; Quercus lusitanica var. mirbeckii; Quercus lusitanica var. salzmänniana; Quercus mirbeckii Durieu; Quercus mirbeckii var. angustifolia; Quercus mirbeckii var. fagifolia; Quercus mirbeckii var. spinosa; Quercus mirbeckii var. subpedunculata; Quercus mirbeckii var. typica; Quercus nordafricana Villar; Quercus salzmänniana (Webb) Cout.;</p> | <p>Quercus canariensis Willd. (chêne zéen)</p> |

How to create maps of Mediterranean conifers? Sources for countries of native distribution

- a – The Med-Checklist (<http://ww2.bgbm.org/mcl/query.asp>)
- b – The Euro+Med PlantBase (<http://ww2.bgbm.org/EuroPlusMed/query.asp>)
- c – KEW World Checklist (<http://apps.kew.org/wcsp/home.do>)

POLITICAL BORDERS AND/OR BIO-GEOGRAPHICAL REGIONS

How to create maps of Mediterranean conifers? A wealth of resources, but...

Online sources (shape files or X Y coordinates):

- GBIF Global Biodiversity Information Facility (<http://www.gbif.org>)
- EUFORGEN European forest genetic resources programme (<http://www.euforgen.org/distribution-maps>) -> 4 species
- JRC European Forest Data Center -> 1 species (<http://forest.jrc.ec.europa.eu/efdac/applications/species-distribution/>)
- National Forest Inventories -> not often available online
- Scientific publications

How to create maps of Mediterranean conifers?

Published paper maps sources: mostly floras

- K. Browitz, 1982, Chorology of trees and shrubs in South-West Asia and adjacent Regions.
- P. Quézel & S. Santa, 1962, Nouvelle Flore de l'Algérie et des régions désertiques méridionales, Centre national de la Recherche scientifique.
- M. Fennane, 1999, Flore pratique du Maroc, manuel de détermination des plantes vasculaires vol 1: Pteridophyta, Gymnospermae, Angiospermae (Lauraceae-Neuradaceae), Institut Scientifique - Université Mohammed V - Agdal, Rabat
- L. Boulos, 1999, Flora of Egypt, Volume 1: Azollaceae-Oxalidaceae, Al Hadara Publishing
- O. de *Bolòs* & J. *Vigo*, 1984-2001 Flora dels Països Catalans, Vol I-IV, Editoriol Barcino
- M. Gounot, J.L. Guillermin, A. Schoenenberger, 1965, Carte phyto-écologique de la Tunisie Septentrionale Feuille I CAP BON – La Goulette – Sousse, CNRS/CEPE
- A. Bigot, C. Floret, J.L. Guillermin, J.C. Jacquinet, A. Soler, 1965 Carte phyto-écologique de la Tunisie Septentrionale Feuille II Bizerte - Tunis , CNRS/CEPE

How to create maps of Mediterranean conifers?

Published paper maps sources: mostly floras

- Quezel & Medail, 2003, *Ecologie et Biogéographie des forêts du bassin Méditerranéen*, IMEP, Université d'Aix-Marseille III
- P.H. Davis, 1978, *Flora of turkey and the East Aeagean islands*, Edinburgh at the University Press
- Atlas Flora Europaeae, software 1999
- Atlas of Turkish Forests (Türkiye Orman Atlası)
- Yaltirak, 1984, *Türkiyenin Meseleri Teshis Kılavuzu*, TOKB, Istanbul
- Emberger, 1936, *Carte phytogéographique du Maroc*

How to create maps of Mediterranean conifers? IN SOME CASE USING SHAPEFILES

- EUFORGEN

LEBANON

- Miguel angel Navarrete Poyatos, Center for Applied Research in Agroforestry Development, IDAF

- Lebanon Forest Map, Ministry of Agriculture, FAO

ALGERIA

- Inventaire Forestier National, Direction Générale des forêts, Algérie

How to create maps of Mediterranean conifers?

IN TOTAL AROUND 100 PAPER MAPS WERE:

- 1- SCANNED
- 2- GEOREFERENCED
- 3- DIGITIZED

Data from different sources were compiled using
Q-GIS

A case study with Ilex aquifolium L.



Countries/Regions of native distribution

Sources for countries of native distribution

The Med-Checklist GREUTER *et al.*, 1984

Algeria (Ag) present as native;
Albania (Al) present as native;
Asiatic Turkey (An) present as native;
Balearic Islands (Bl) present as native;
Bulgaria (Bu) present as native;
Corsica (Co) present as native;
France (Ga) present as native;
Greece (Gr) present as native;
Spain (Hs) present as native;
Italy (It) present as native;
Jugoslavia (Ju) present as native;
Lebanon and Syria (LS) present as native;
Portugal (Lu) present as native;
Morocco (Ma) present as native;
Sardinia (Sa) present as native;
Sicily (Si) present as native;
Tunisia (Tn) present as native

Ag Al An Bl Bu
Co Ga Gr Hs It
Ju LS Lu Ma Sa
Si Tn

How to create maps of Mediterranean conifers? Sources for countries of native distribution

The Euro+Med PlantBase

Ag Al Au(A) Be(L) BH BI(M) Br Bu Cg Co Ct Da Ga Ge Gr
Hb(E) He Ho Hs(A S) It LS Lu Ma Mk No dRm Sa Si(S) SI Sr
Su Tn Tu(A) [cHu]

Name: **Ilex aquifolium L.**

Nomencl. ref.: **Sp. Pl.: 125. 1753**

Rank: Species

Status: **ACCEPTED**

Occurrence:

| Code | Region | Status | Source |
|-------------|----------------------------|----------------|---------------------------|
| Ag | Algeria | native | Reference |
| Al | Albania | native | Reference |
| Au | Austria with Liechtenstein | native | Reference |
| Au(A) | Austria | native | Reference |
| Be | Belgium with Luxembourg | native | Reference |
| Be(L) | Luxembourg | native | Reference |
| BH | Bosnia-Herzegovina | native | Reference |
| Bl | Baleares | native | Reference |
| Bl | Baleares | native | Calculated |
| Bl(M) | Mallorca | native | Reference |
| Br | Great Britain | native | Reference |
| Bu | Bulgaria | native | Reference |
| Cg | Montenegro | native | Reference |
| Co | Corse | native | Reference |
| Ct | Croatia | native | Reference |
| Da | Denmark with Bornholm | native | Reference |
| EM | Euro+Med | endemic for EM | Reference |
| Ga | France | native | Reference |
| Ge | Germany | native | Reference |
| Gr | Greece | native | Reference |
| Hb | Ireland | native | Reference |
| Hb | Ireland | native | Calculated |
| Hb(E) | Ireland | native | Reference |
| He | Switzerland | native | Reference |
| Ho | Netherlands | native | Reference |
| Hs | Spain | native | Reference |
| Hs | Spain | native | Calculated |
| Hs(A) | Andorra | native | Reference |
| Hs(S) | Spain | native | Reference |
| Hu | Hungary | cultivated | Reference |

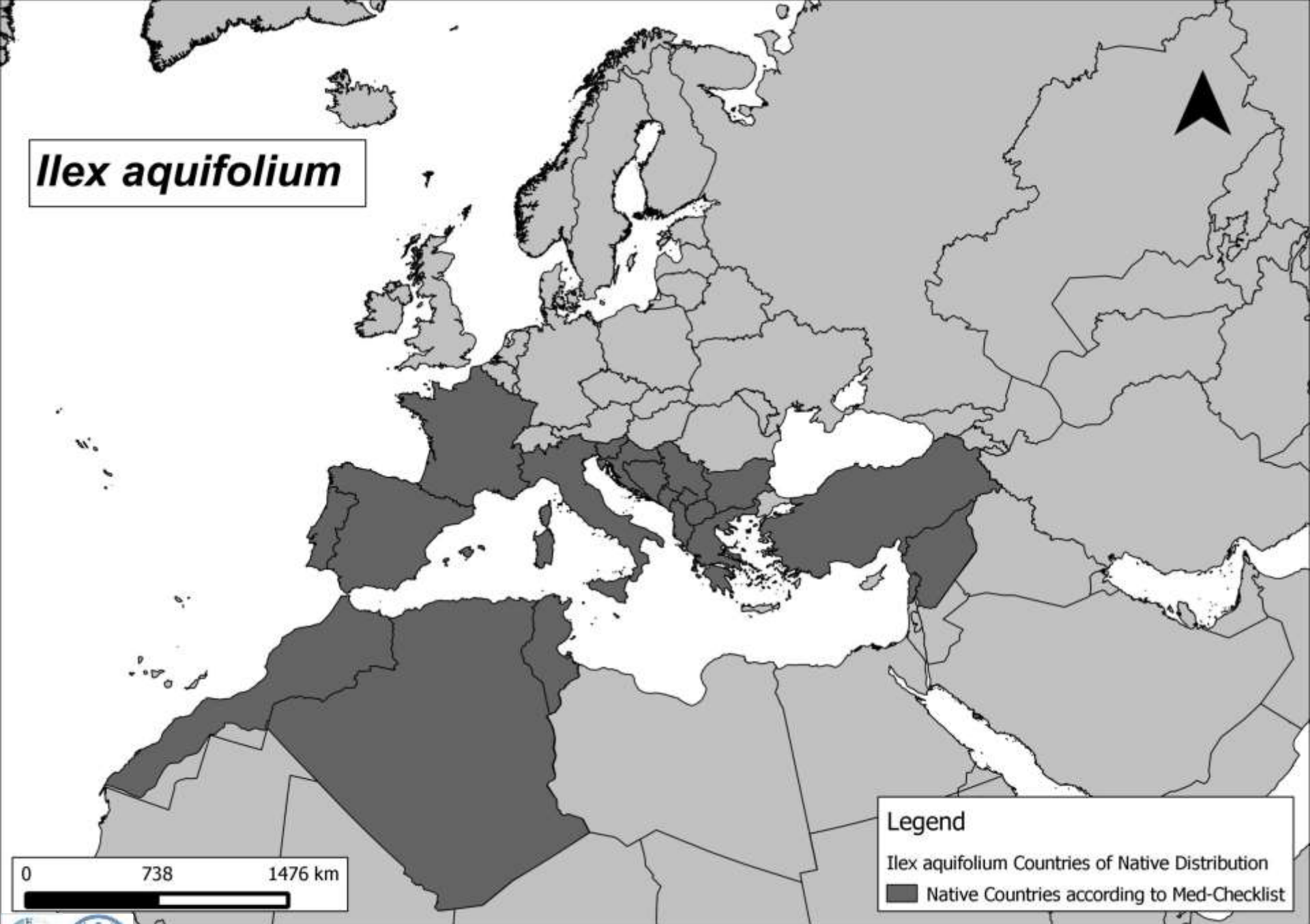
| | | | |
|-------|--|---------------------------|---------------------------|
| Hu | Hungary | cultivated | Reference |
| It | Italy | native | Reference |
| Ju | Former Yugoslavia | native | Reference |
| Ju | Former Yugoslavia | native | Calculated |
| LS | Lebanon-Syria | native | Reference |
| Lu | Portugal | native | Reference |
| Ma | Morocco | native | Reference |
| Mk | The former Yugoslav Republic of Makedonija | native | Reference |
| No | Norway | native | Reference |
| Rm | Romania | native: doubtfully native | Reference |
| Sa | Sardegna | native | Reference |
| Si | Sicily with Malta | native | Reference |
| Si(S) | Sicily | native | Reference |
| Sl | Slovenia | native | Reference |
| Sr | Serbia including Kosovo and Vojvodina | native | Reference |
| Su | Sweden | native | Reference |
| Tn | Tunisia | native | Reference |
| Tu | Turkey | native | Calculated |
| Tu(A) | Asiatic Turkey | native | Reference |

Display software last updated: January 2011
 © Botanic Garden and Botanical Museum Berlin-Dahlem 2006, [Imprint](#)

Greuter, W., Burdet, H. M. & Long, G. - Med-Checklist 1 Genève & Berlin 1984.

Tutin, T. G., Heywood, V. H., Burges, N. A., Valentine, D. H., Walters, S. M. & Webb, D. A. - Flora europaea 1-5 Cambridge University Press Cambridge 1964-1980.

Ilex aquifolium



Legend

Ilex aquifolium Countries of Native Distribution

■ Native Countries according to Med-Checklist

Ilex aquifolium



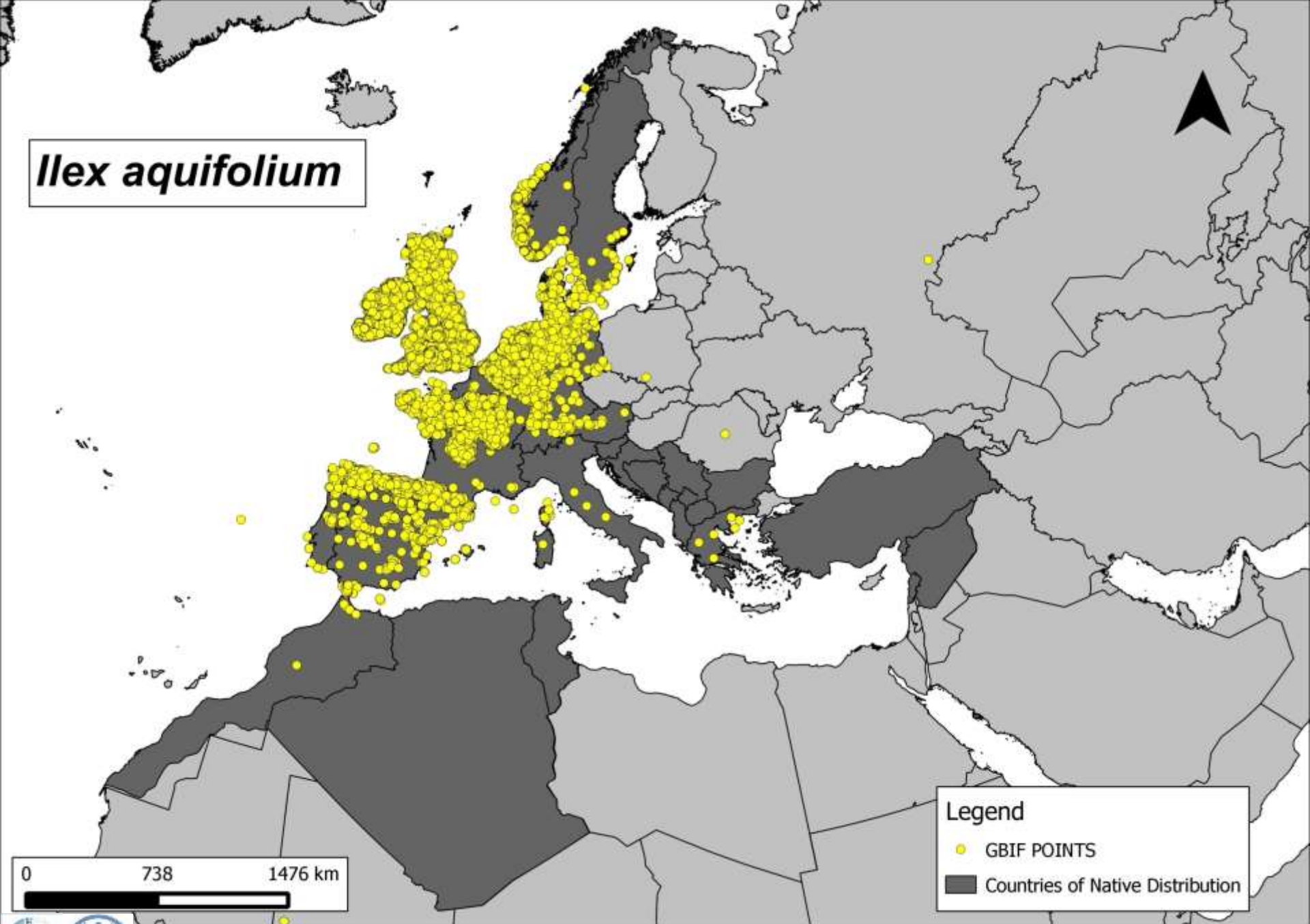
Legend

Ilex aquifolium Countries of Native Distribution

- Native Countries according to Med-Checklist & Euro+Med PlantBase

Compilation of Distribution Data

Ilex aquifolium

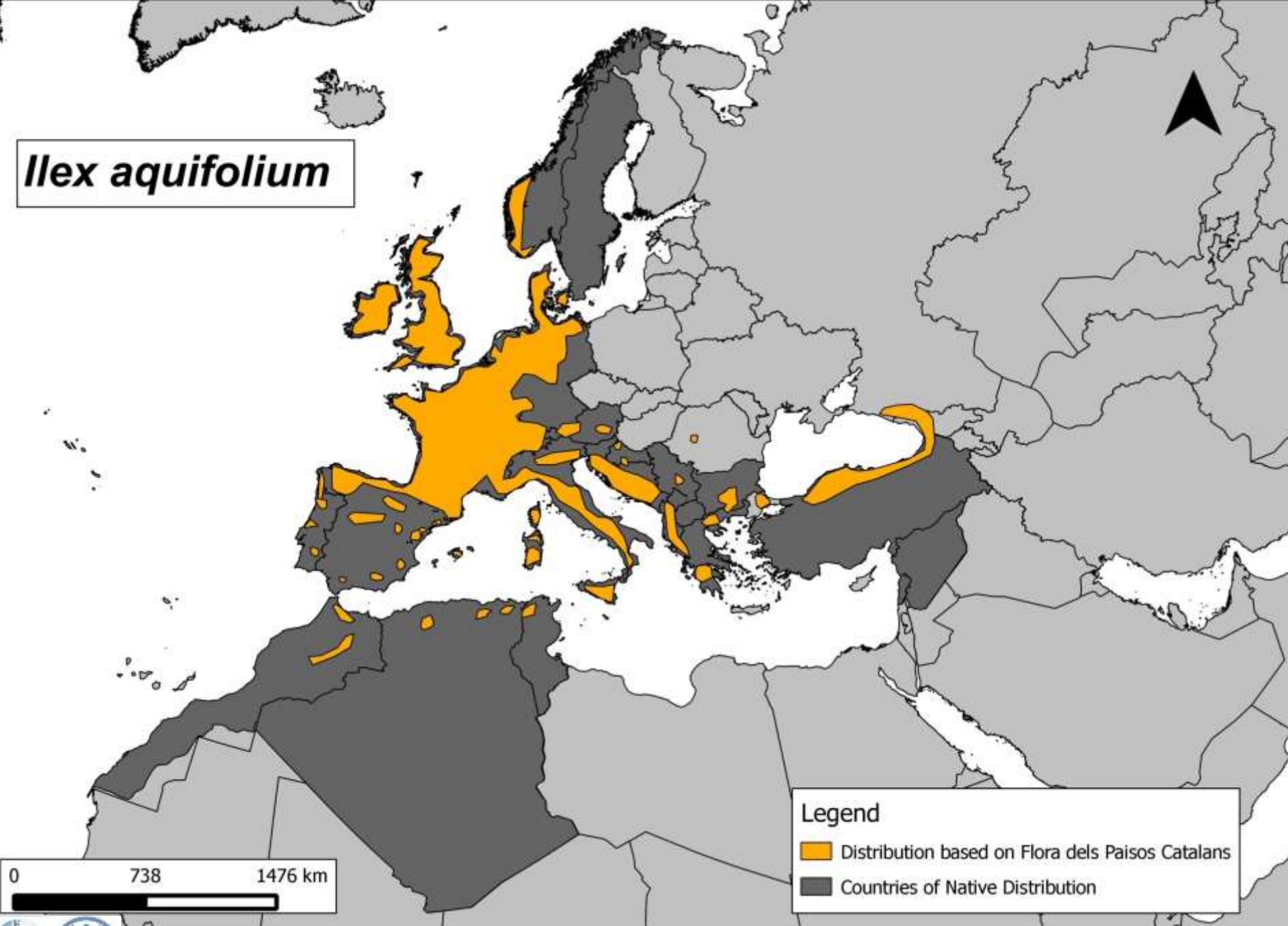


Legend



- GBIF POINTS
- Countries of Native Distribution

0 738 1476 km

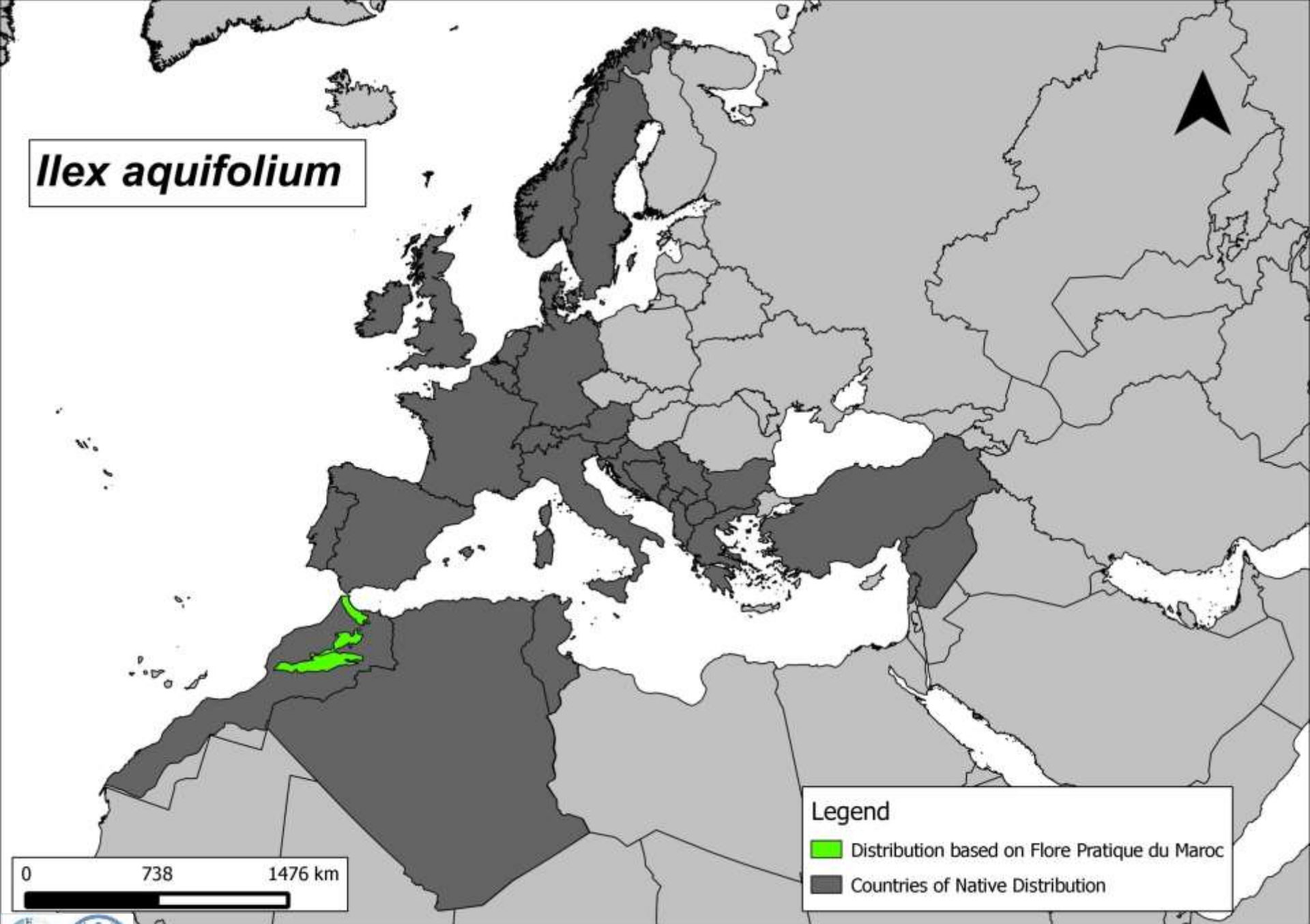
Ilex aquifolium



Legend

-  Distribution based on Flora dels Paisos Catalans
-  Countries of Native Distribution

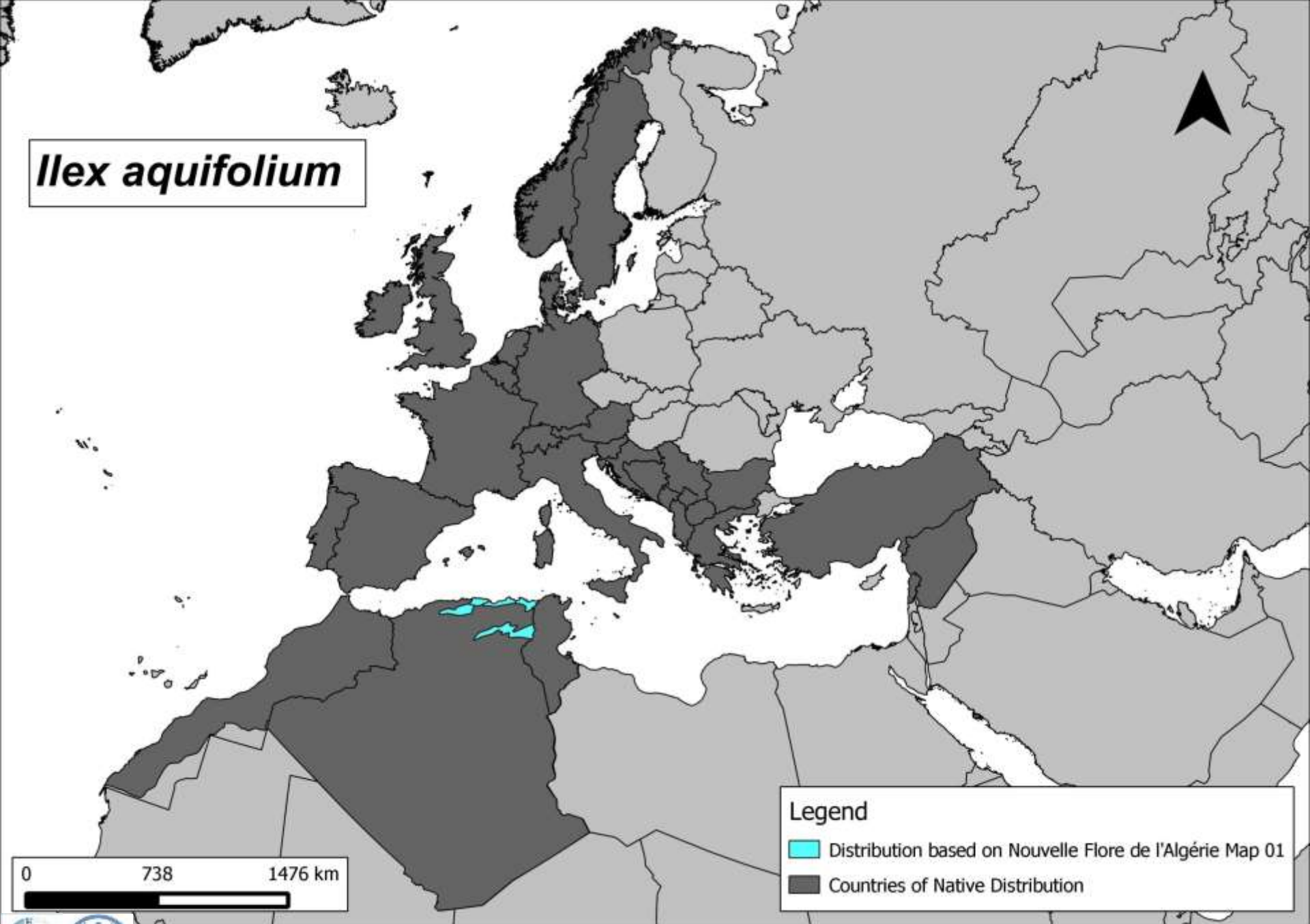
Ilex aquifolium





Legend

- Distribution based on Flore Pratique du Maroc
- Countries of Native Distribution

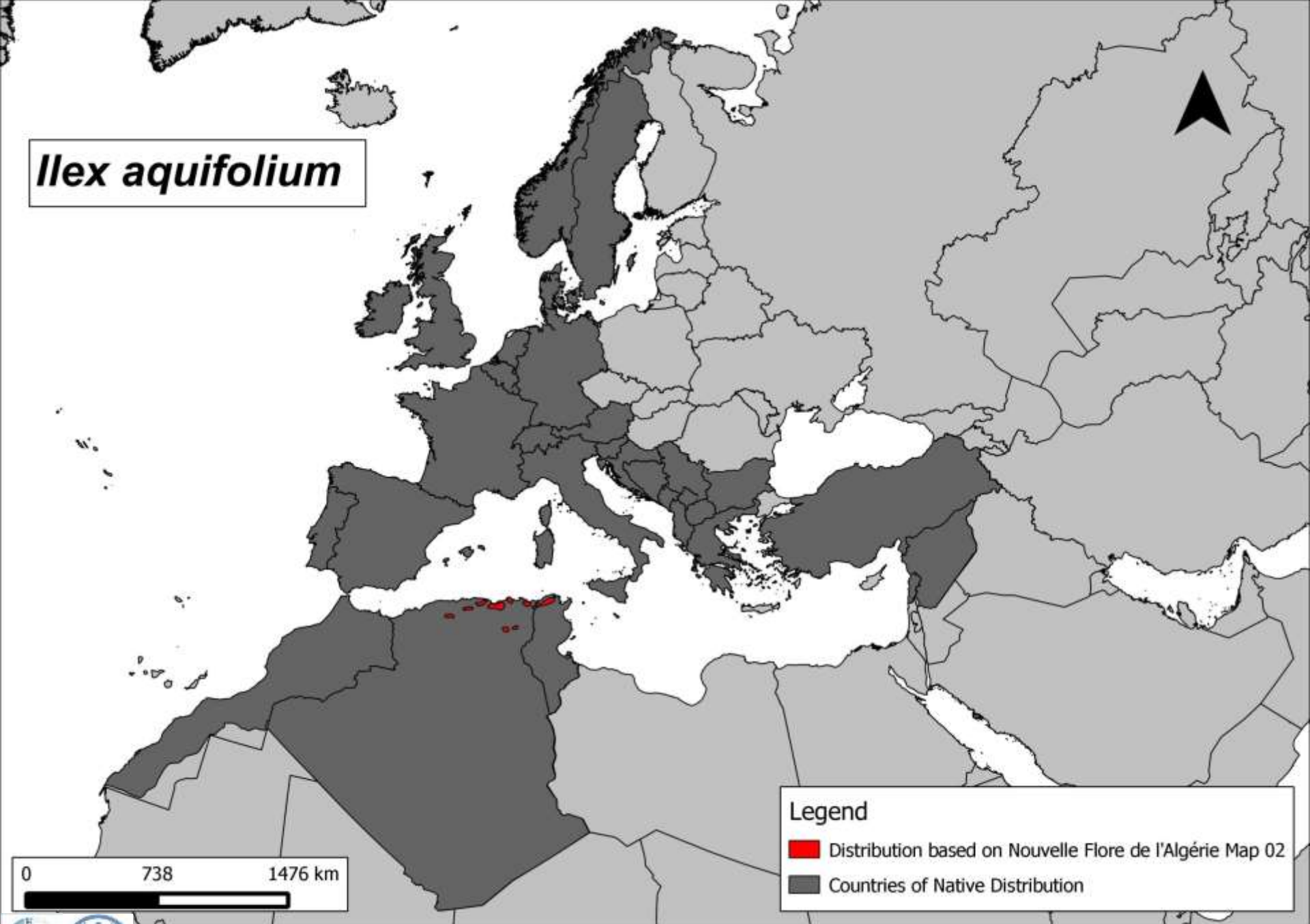
Ilex aquifolium



Legend

-  Distribution based on Nouvelle Flore de l'Algérie Map 01
-  Countries of Native Distribution

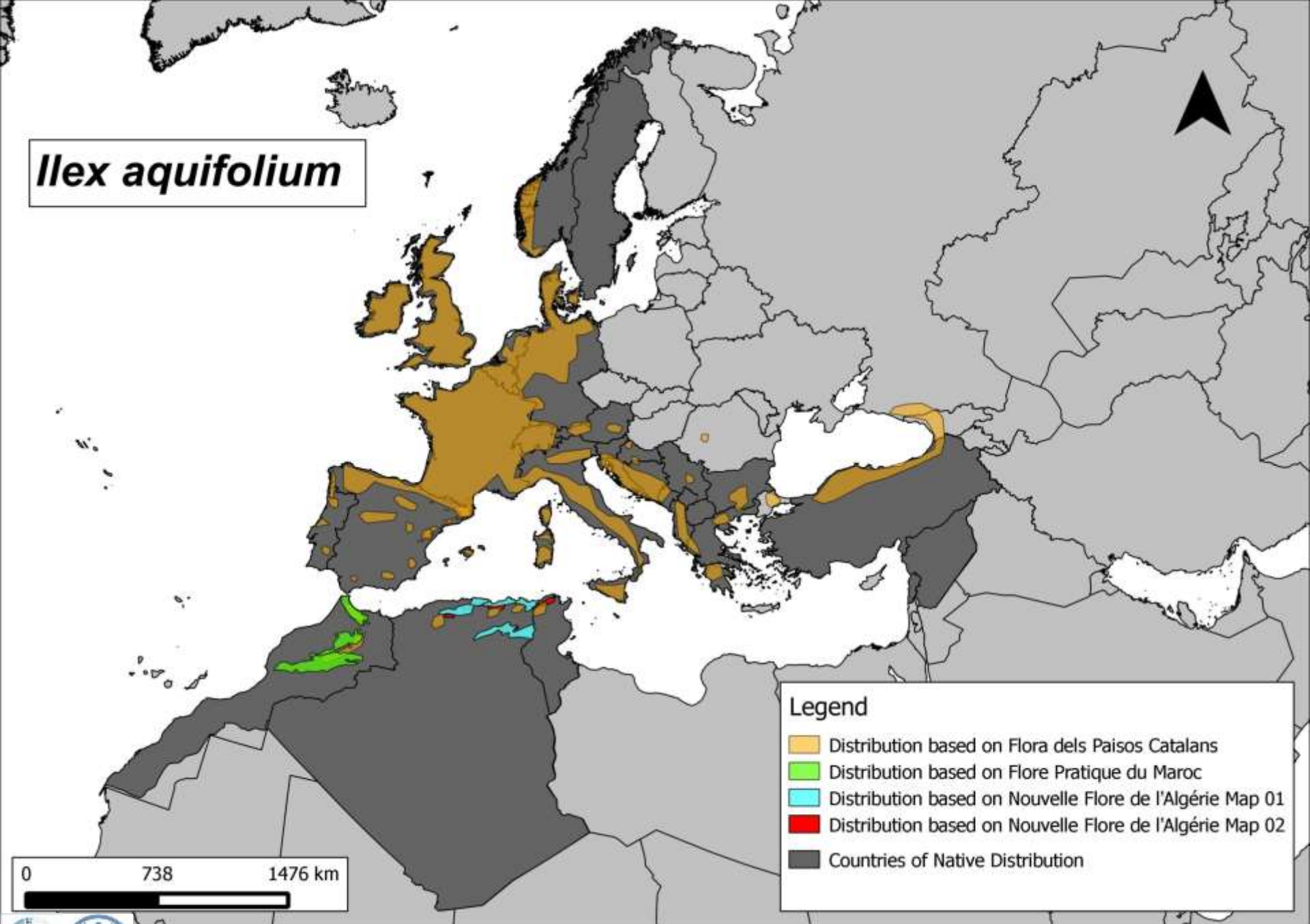
Ilex aquifolium



Legend

- Distribution based on Nouvelle Flore de l'Algérie Map 02
- Countries of Native Distribution

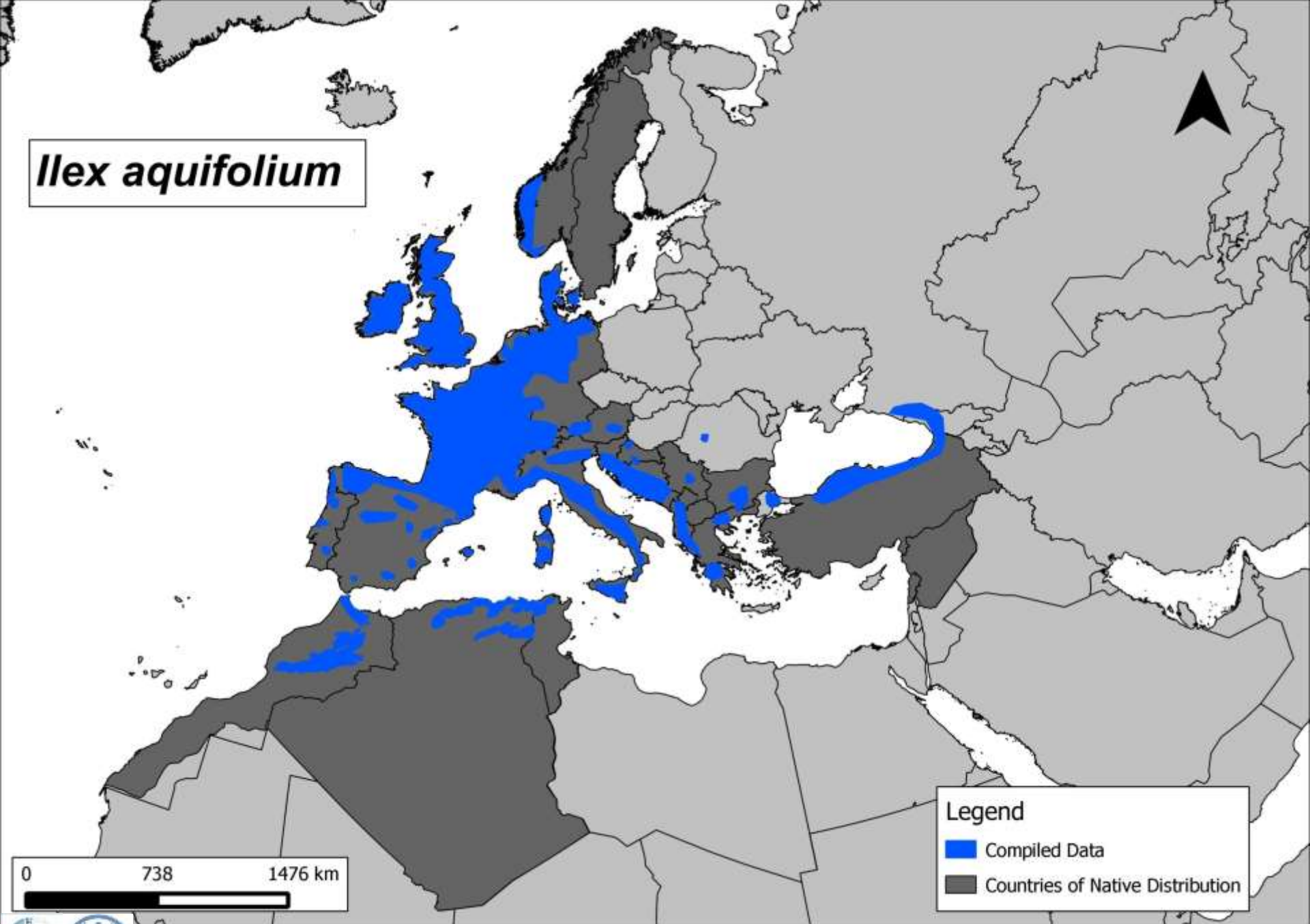
Ilex aquifolium



Legend

-  Distribution based on Flora dels Paisos Catalans
-  Distribution based on Flore Pratique du Maroc
-  Distribution based on Nouvelle Flore de l'Algérie Map 01
-  Distribution based on Nouvelle Flore de l'Algérie Map 02
-  Countries of Native Distribution

Ilex aquifolium



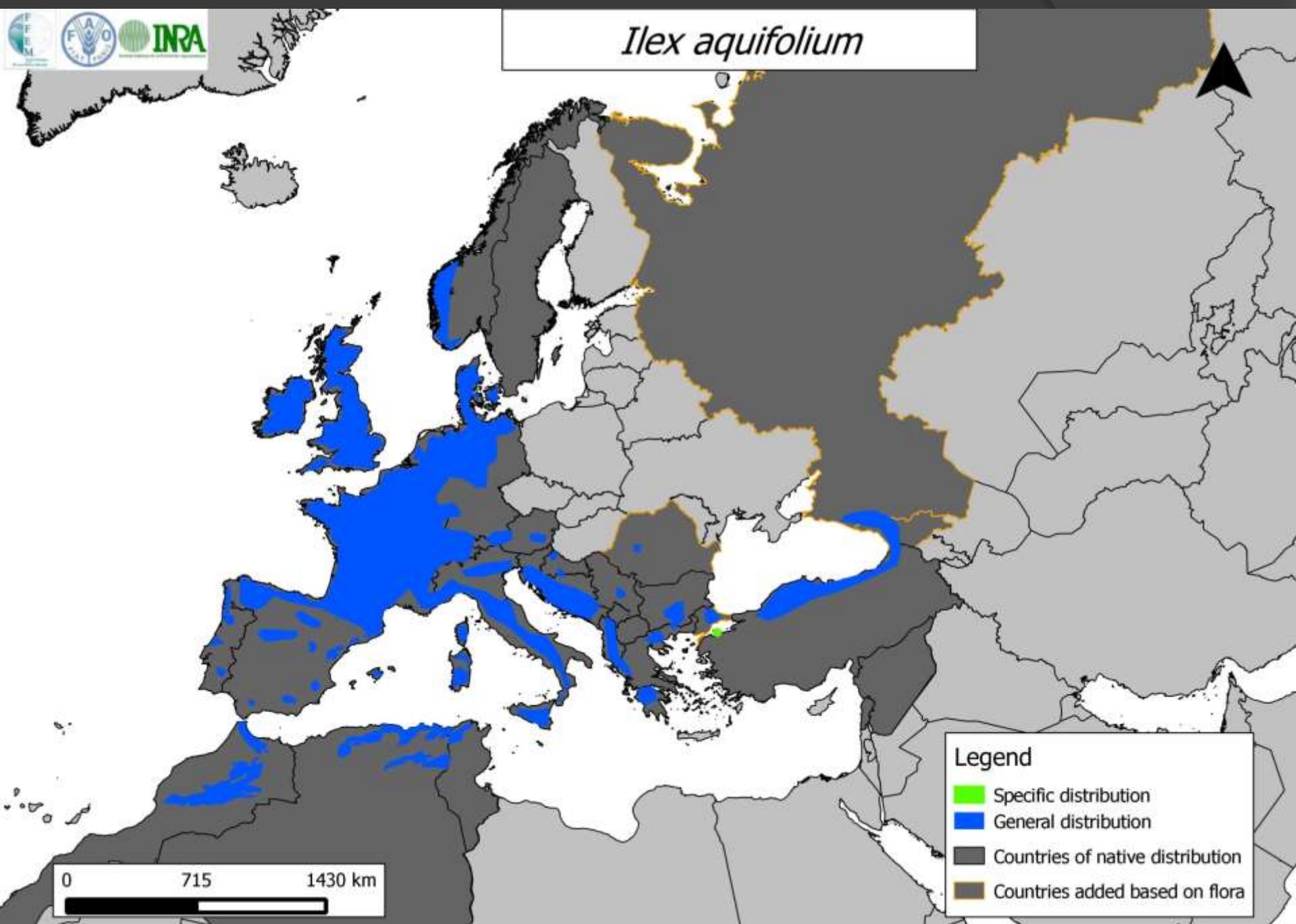
Legend

- Compiled Data
- Countries of Native Distribution





0 738 1476 km

This map is a draft and is still being updated

Ilex aquifolium



Legend

-  Specific distribution
-  General distribution
-  Countries of native distribution
-  Countries added based on flora

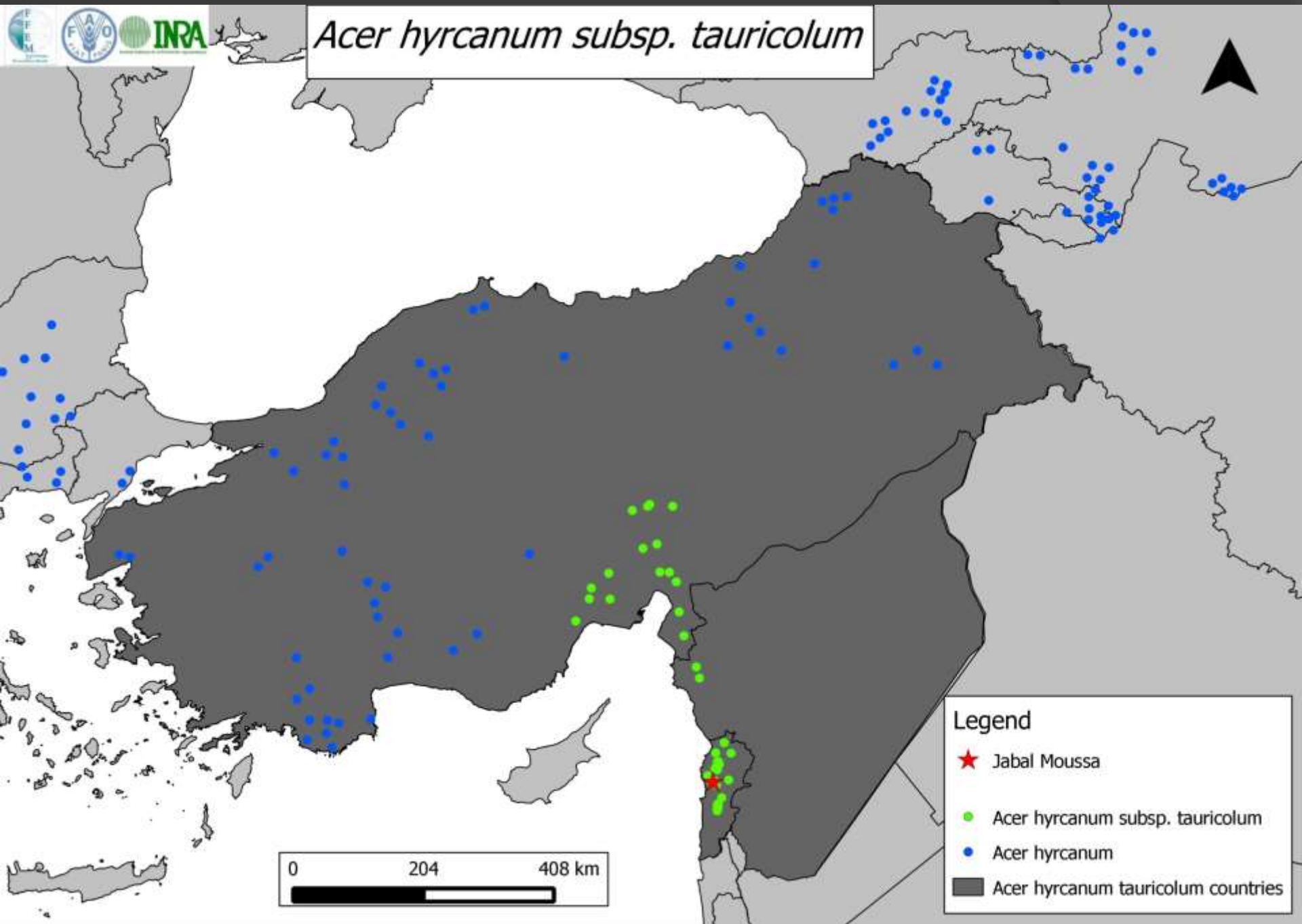
Structure of the shapefile

| | id | Area | Country | Forest_Typ | Sp1_Sci_Na | Sp1_Com_Na | Per_Cover1 | Per_Cover2 | Sp3_Sci_Na | Per_Cover3 | Sp4_Sci_N | Per_Cover4 | Source_Dat | Comments | code_n |
|------|------|------|---------|------------|--------------------|----------------------|------------|------------|------------|------------|-----------|------------|--|-------------------|--------|
| 802 | 802 | NULL | Algeria | NULL | Chamaerops_hu... | Mediterranean_d... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | CC_Tres_commun | A2 |
| 801 | 802 | NULL | Algeria | NULL | Chamaerops_hu... | Mediterranean_d... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | CC_Tres_commun | C1 |
| 800 | 801 | NULL | Algeria | NULL | Ilex_aquifolium | Holly-Houx | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | AC_Asez_commun | K3 |
| 799 | 800 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | A1 |
| 798 | 799 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | O1 |
| 797 | 798 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | O1 |
| 796 | 797 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | O1 |
| 795 | 796 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | O1 |
| 794 | 795 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | O1 |
| 793 | 794 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | H2 |
| 792 | 793 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | O2 |
| 791 | 792 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | H1 |
| 790 | 791 | NULL | Algeria | NULL | Ilex_aquifolium | Holly-Houx | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | AC_Asez_commun | A2 |
| 789 | 790 | NULL | Algeria | NULL | Ilex_aquifolium | Holly-Houx | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | AC_Asez_commun | K2 |
| 788 | 789 | NULL | Algeria | NULL | Ilex_aquifolium | Holly-Houx | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | AC_Asez_commun | K1 |
| 787 | 788 | NULL | Algeria | NULL | Ilex_aquifolium | Holly-Houx | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | R_Rare | A53 |
| 786 | 787 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | A51 |
| 785 | 786 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | A52 |
| 784 | 785 | NULL | Algeria | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | C_Comm | A53 |
| 783 | 784 | NULL | Algeria | NULL | Arbutus_unedo | Strawberry_tree... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | CC_Tres_commun | A2 |
| 782 | 783 | NULL | Algeria | NULL | Arbutus_unedo | Strawberry_tree... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | CC_Tres_commun | O3 |
| 781 | 782 | NULL | Algeria | NULL | Arbutus_unedo | Strawberry_tree... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | RR_Tres_rare | A52 |
| 780 | 781 | NULL | Algeria | NULL | Arbutus_unedo | Strawberry_tree... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | RR_Tres_rare | A51 |
| 779 | 780 | NULL | Algeria | NULL | Arbutus_unedo | Strawberry_tree... | NULL | NULL | NULL | NULL | NULL | NULL | Nouvelle_Flore_de_JAlgerie_Quezel_et_Santa_1962 | CC_Tres_commun | C1 |
| 31 | 32 | NULL | Algeria | NULL | Pinus | NULL | NULL | NULL | NULL | NULL | NULL | NULL | From_FAO_Forests_Report_Algeria | NULL | NULL |
| 880 | 881 | NULL | Egypt | NULL | Juniperus_phoen... | Phoenician_junip... | NULL | NULL | NULL | NULL | NULL | NULL | Flora_of_Egypt_Volume_One_Azollaceae_Oxalidac... | Random_Polygon... | S |
| 879 | 880 | NULL | Egypt | NULL | Pistacia_lentiscus | Mastic_tree-Lenti... | NULL | NULL | NULL | NULL | NULL | NULL | Flora_of_Egypt_Volume_One_Azollaceae_Oxalidac... | Random_polygon... | M |
| 878 | 879 | NULL | Egypt | NULL | Pistacia_lentiscus | Mastic_tree-Lenti... | NULL | NULL | NULL | NULL | NULL | NULL | Flora_of_Egypt_Volume_One_Azollaceae_Oxalidac... | Random_polygon... | NULL |
| 675 | 676 | NULL | Ireland | NULL | Taxus_baccata | European_yew-If | NULL | NULL | NULL | NULL | NULL | NULL | Flora_dels_Paisos_Catalans | Map02 | NULL |
| 485 | 486 | NULL | Ireland | NULL | Ilex_aquifolium | Holly-Houx | NULL | NULL | NULL | NULL | NULL | NULL | Flora_dels_Paisos_Catalans | Map02 | NULL |
| 4398 | 4399 | NULL | Morocco | NULL | Quercus_suber | Cork_oak-Chene... | NULL | NULL | NULL | NULL | NULL | NULL | Bohbot_CEFE_2005 | NULL | NULL |
| 4397 | 4398 | NULL | Morocco | NULL | Quercus_suber | Cork_oak-Chene... | NULL | NULL | NULL | NULL | NULL | NULL | Bohbot_CEFE_2005 | NULL | NULL |

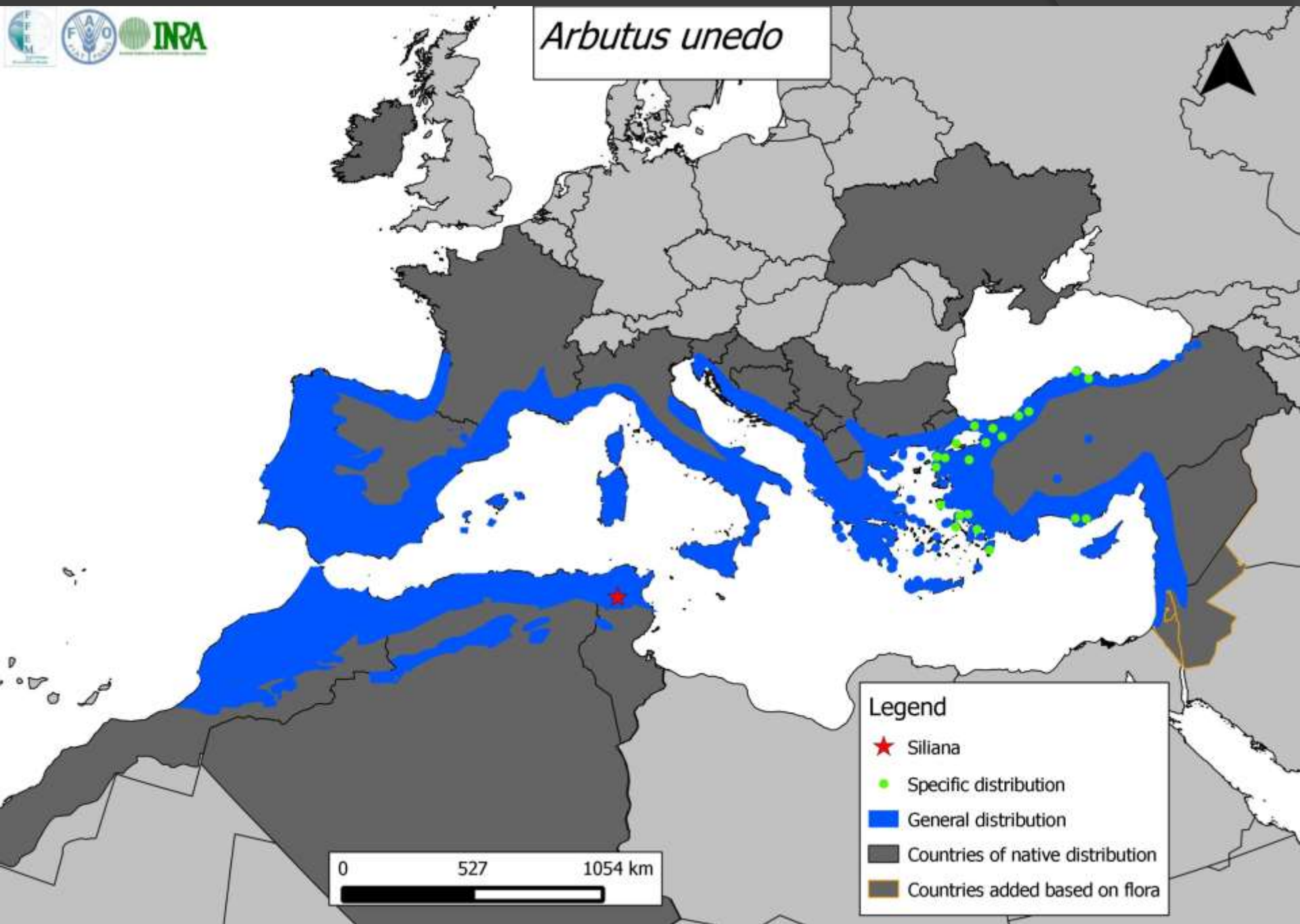
In total :
Around 100 maps were digitized.
Over 18 000 entries (points/polygons) were created.

***A series of 24 new distribution maps for
Mediterranean forest tree species***

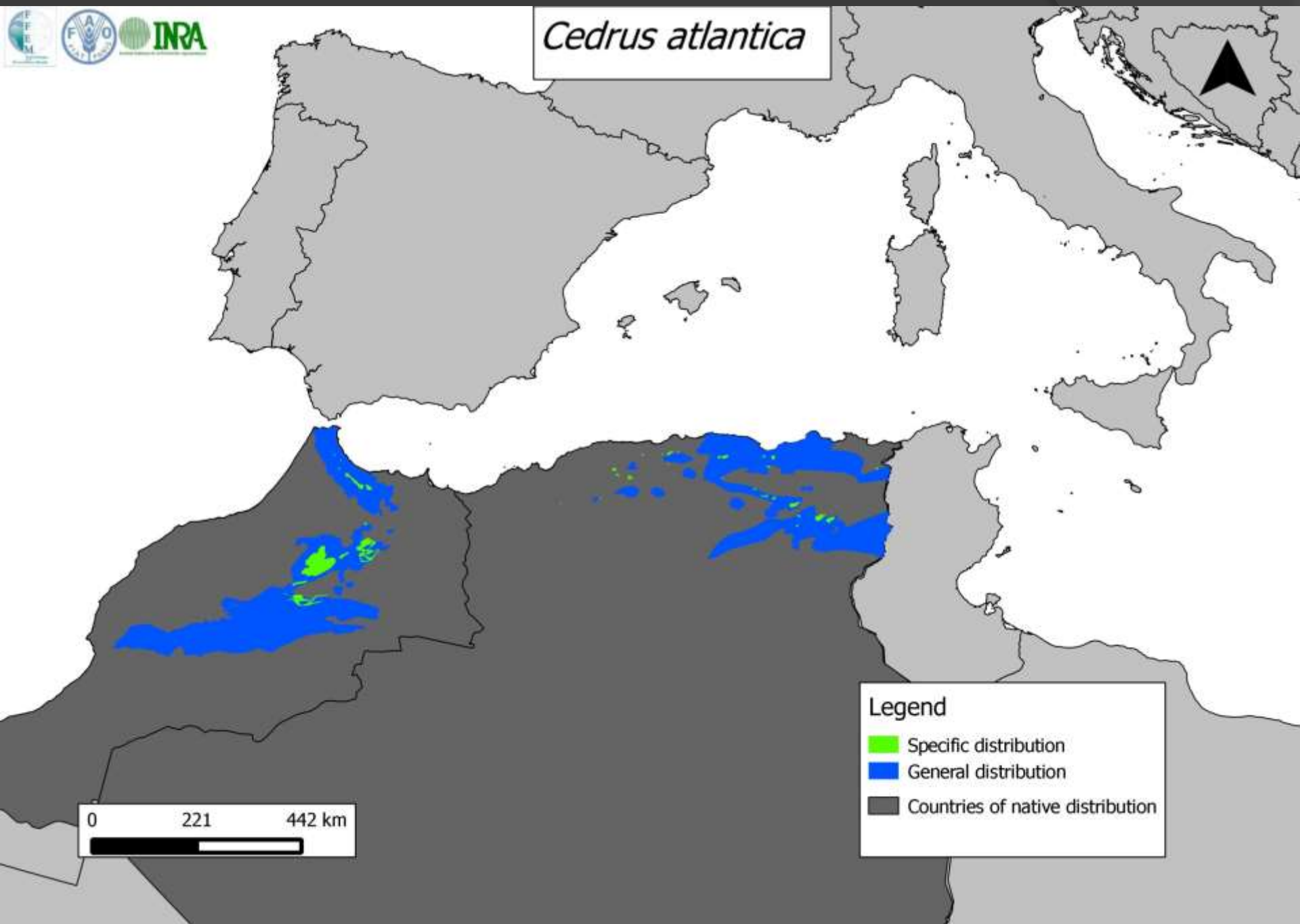
Acer hyrcanum subsp. tauricum



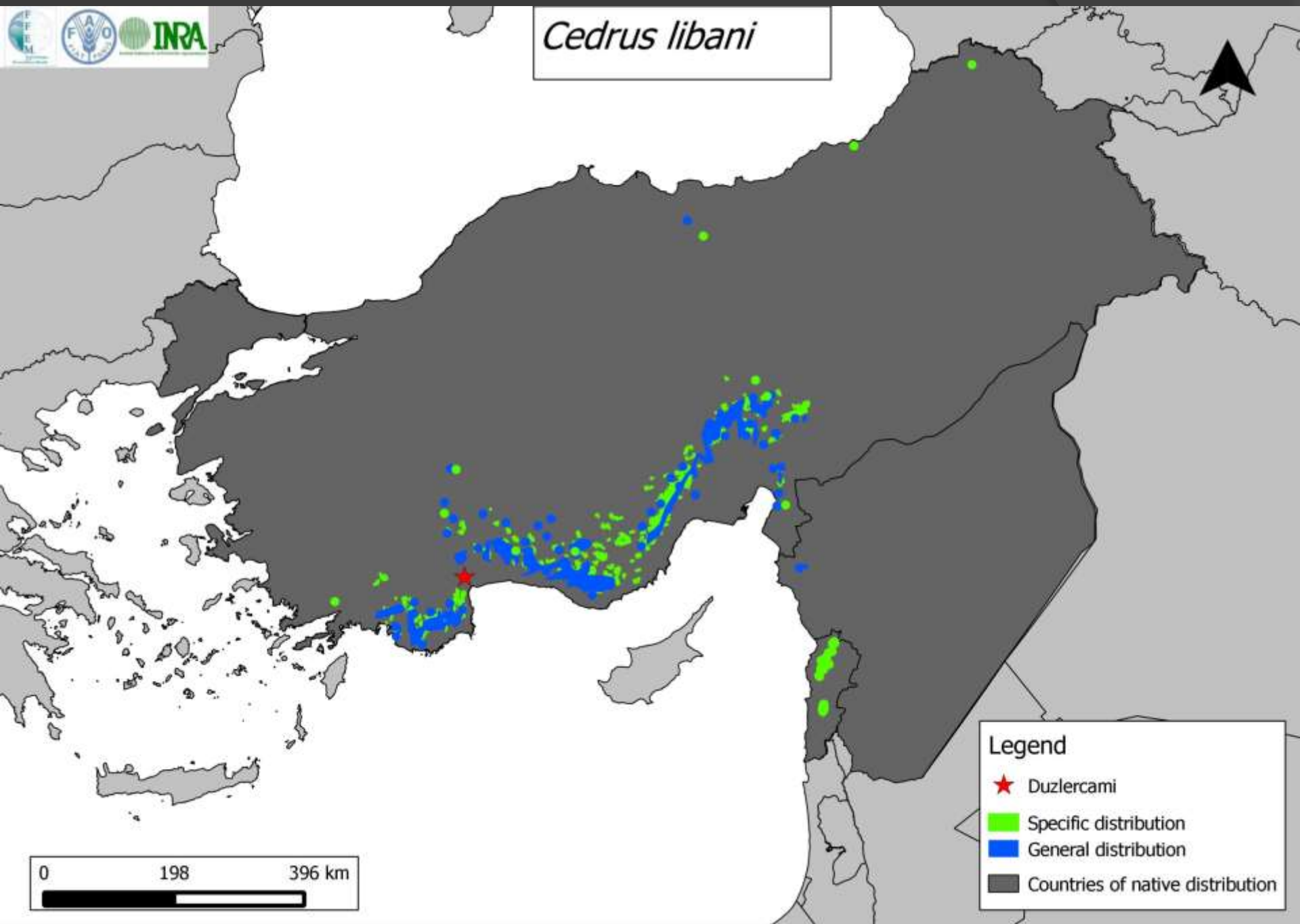
Arbutus unedo



Cedrus atlantica



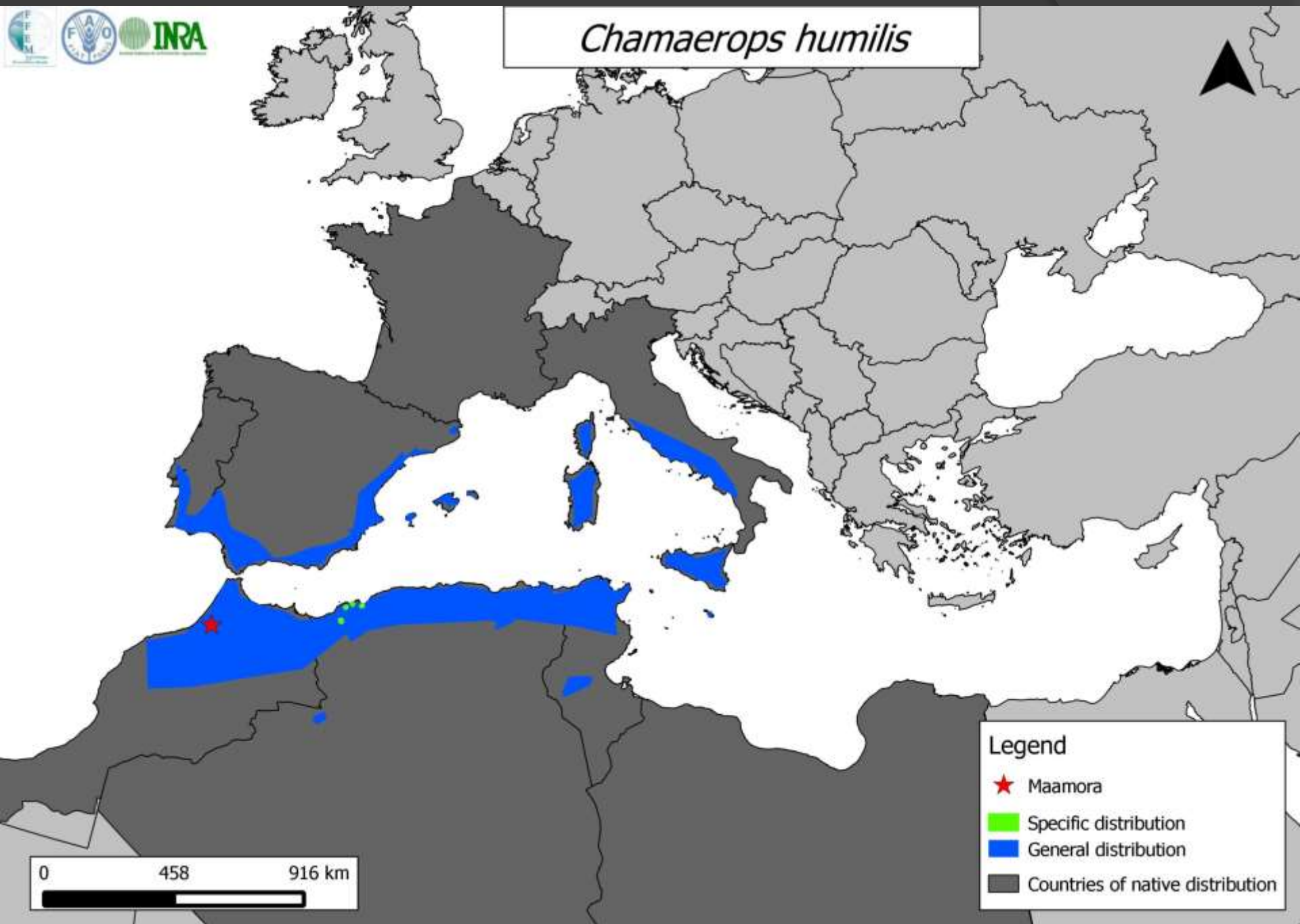
Cedrus libani



Legend

- ★ Duzlercami
- Specific distribution
- General distribution
- Countries of native distribution

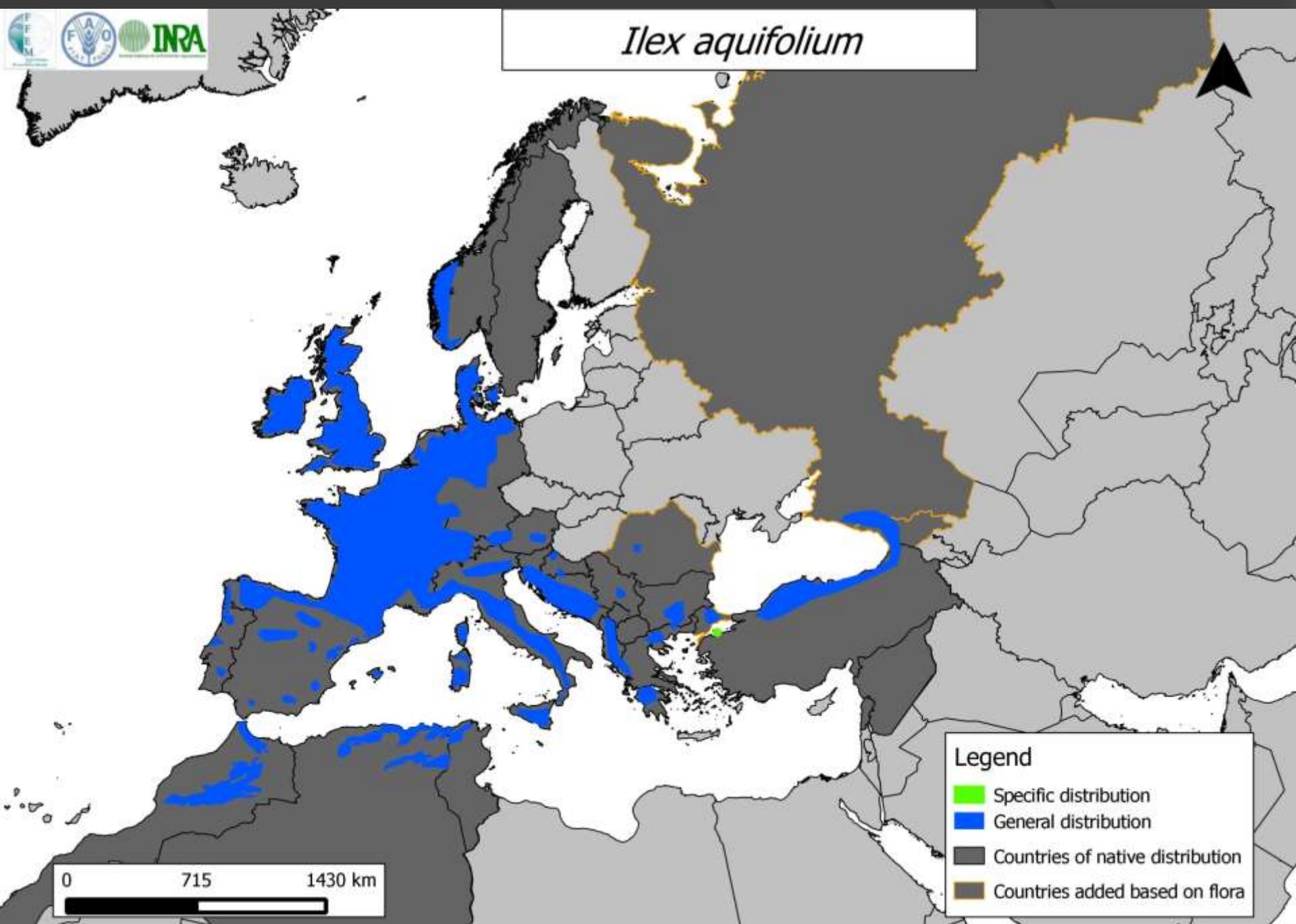
Chamaerops humilis







Legend

- ★ Maamora
- Specific distribution
- General distribution
- Countries of native distribution

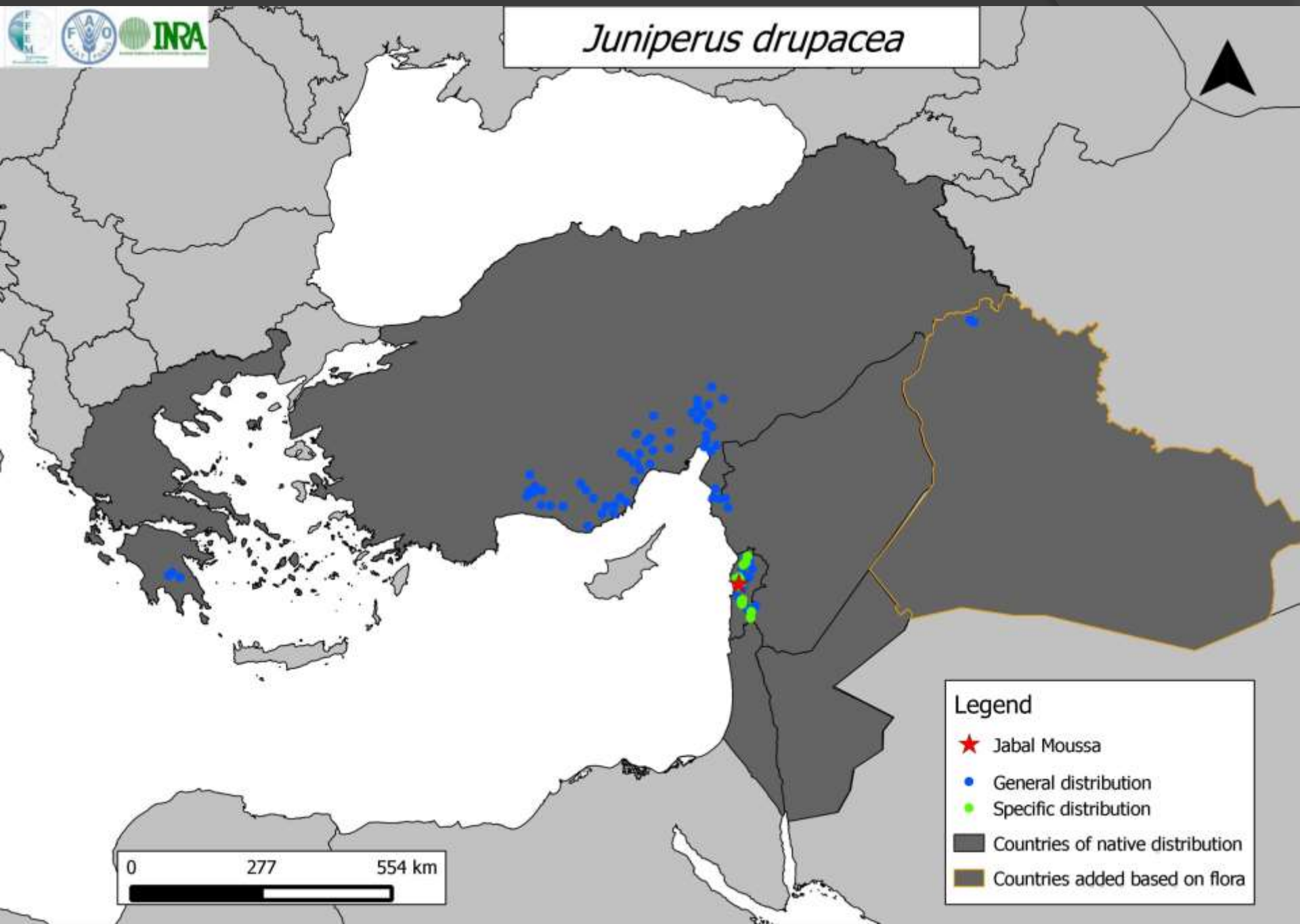
Ilex aquifolium



Legend

-  Specific distribution
-  General distribution
-  Countries of native distribution
-  Countries added based on flora

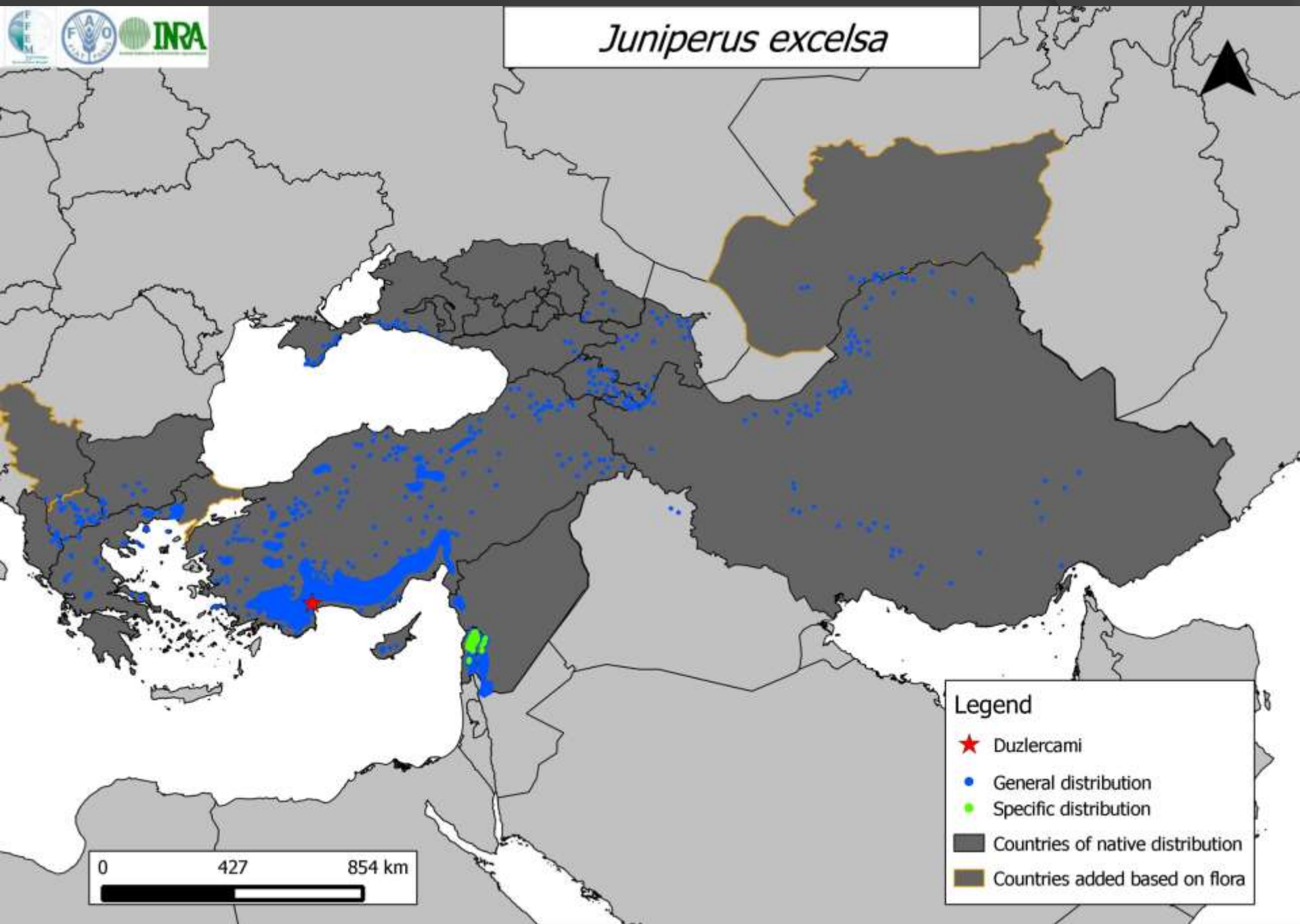
Juniperus drupacea



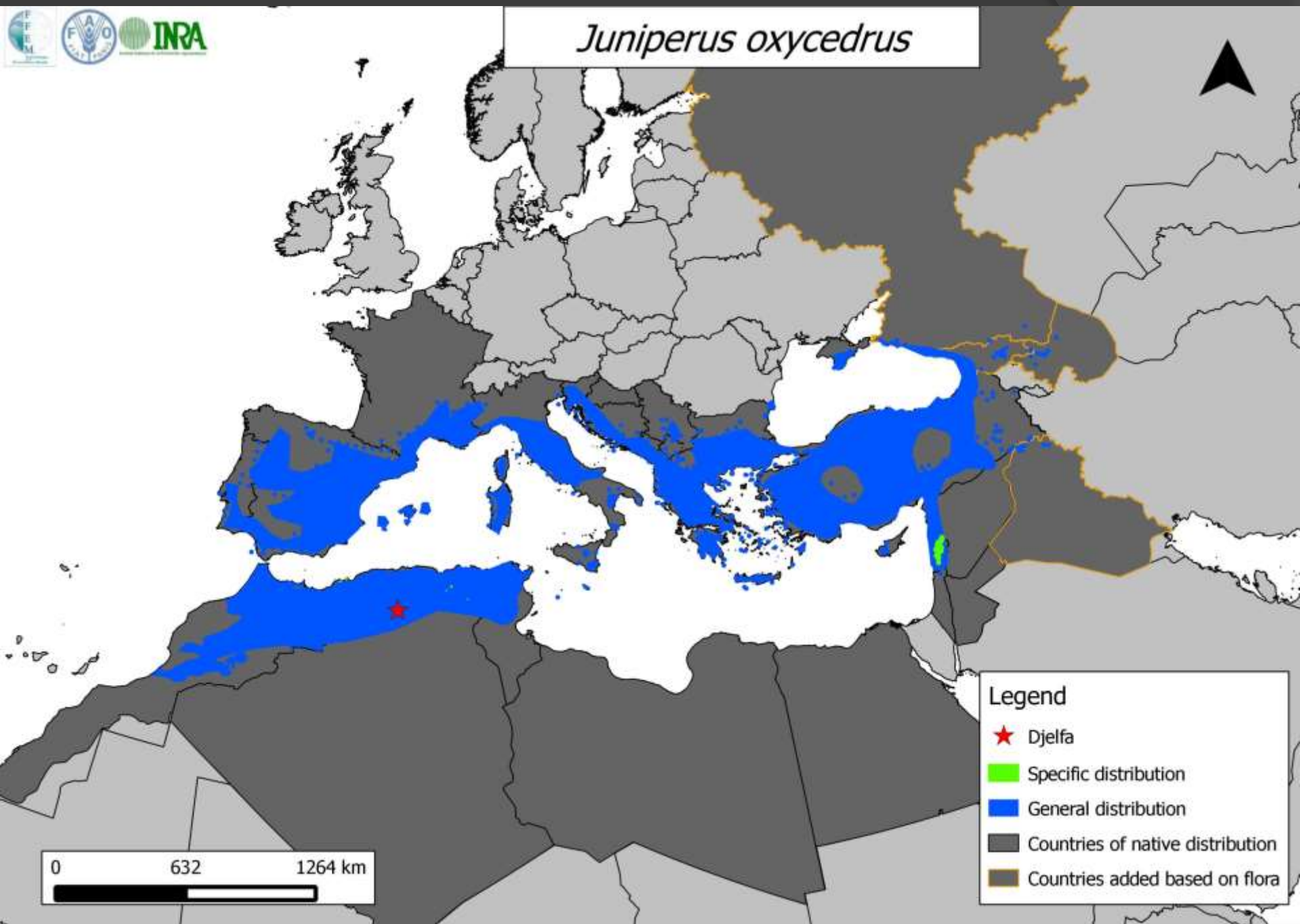
Legend

- ★ Jabal Moussa
- General distribution
- Specific distribution
- Countries of native distribution
- Countries added based on flora

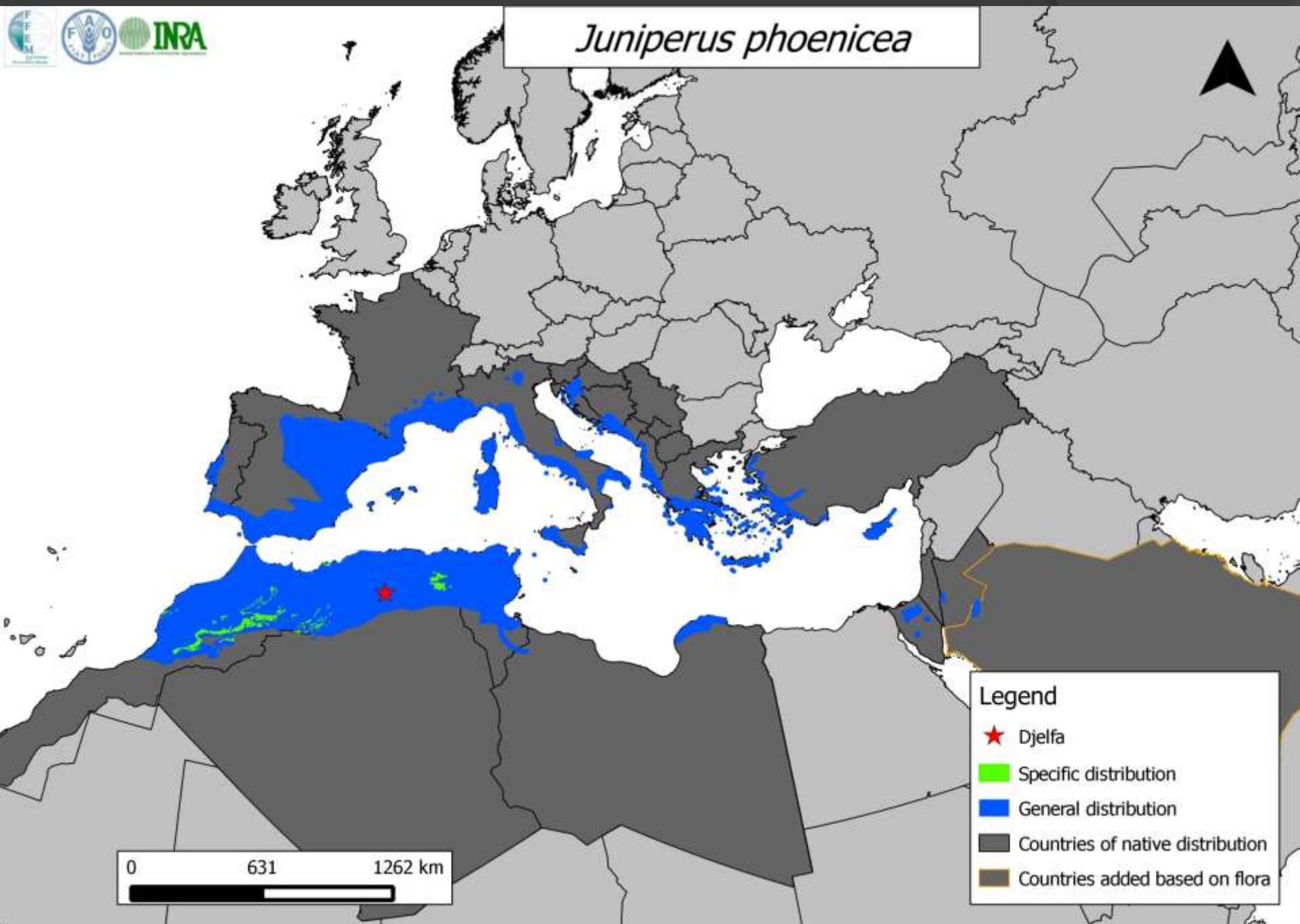
Juniperus excelsa



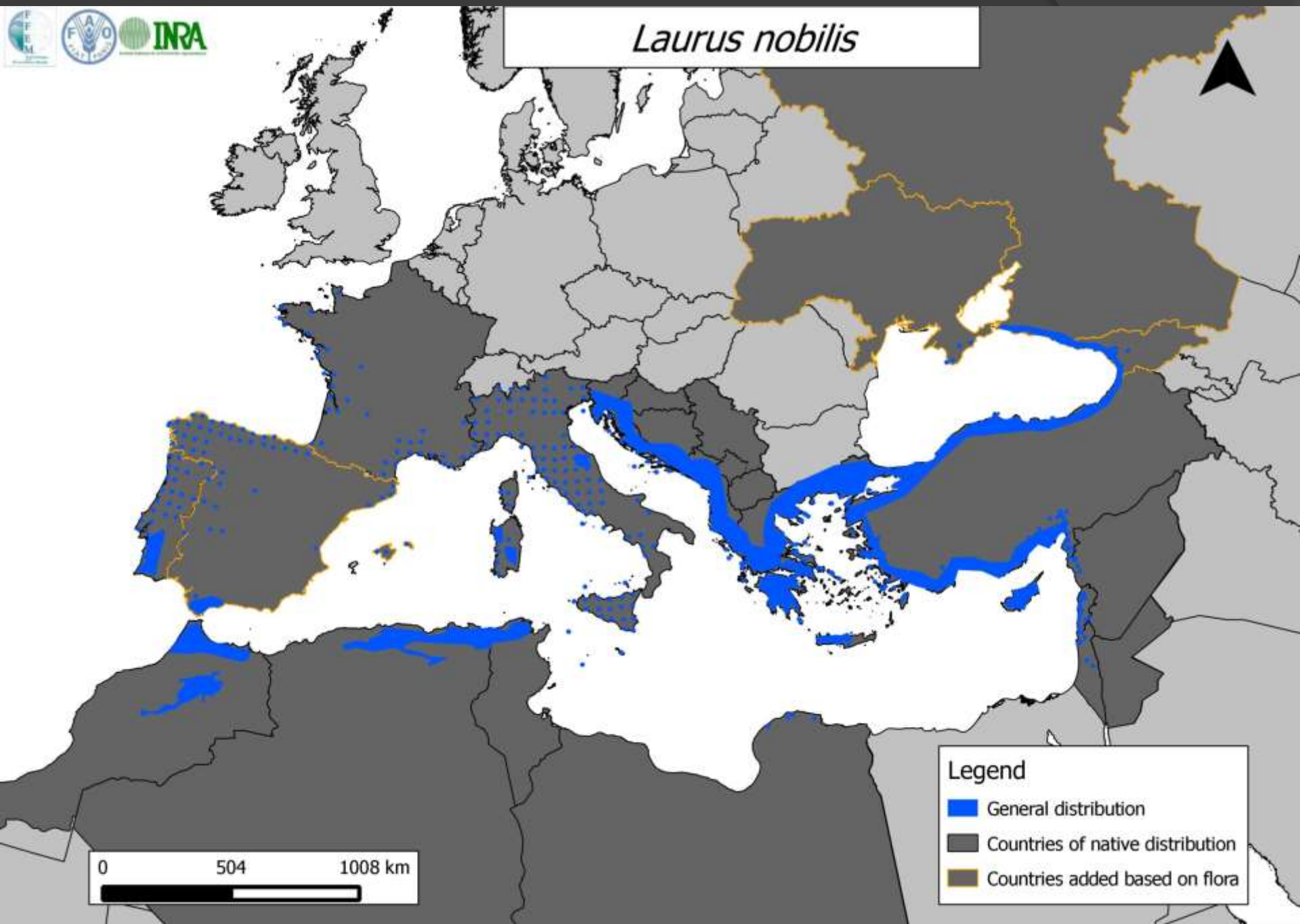
Juniperus oxycedrus






Juniperus phoenicea



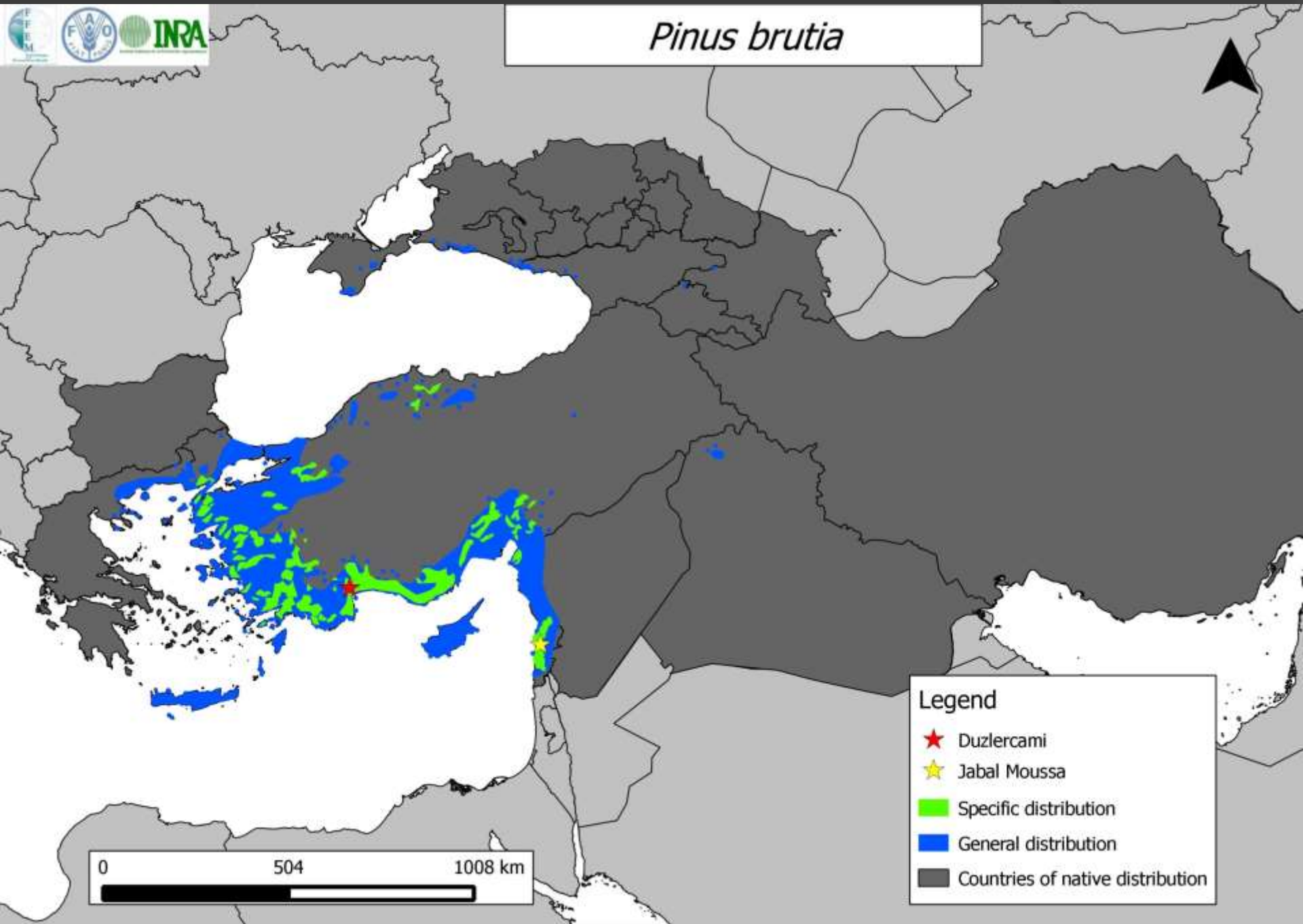
Laurus nobilis



Legend

-  General distribution
-  Countries of native distribution
-  Countries added based on flora

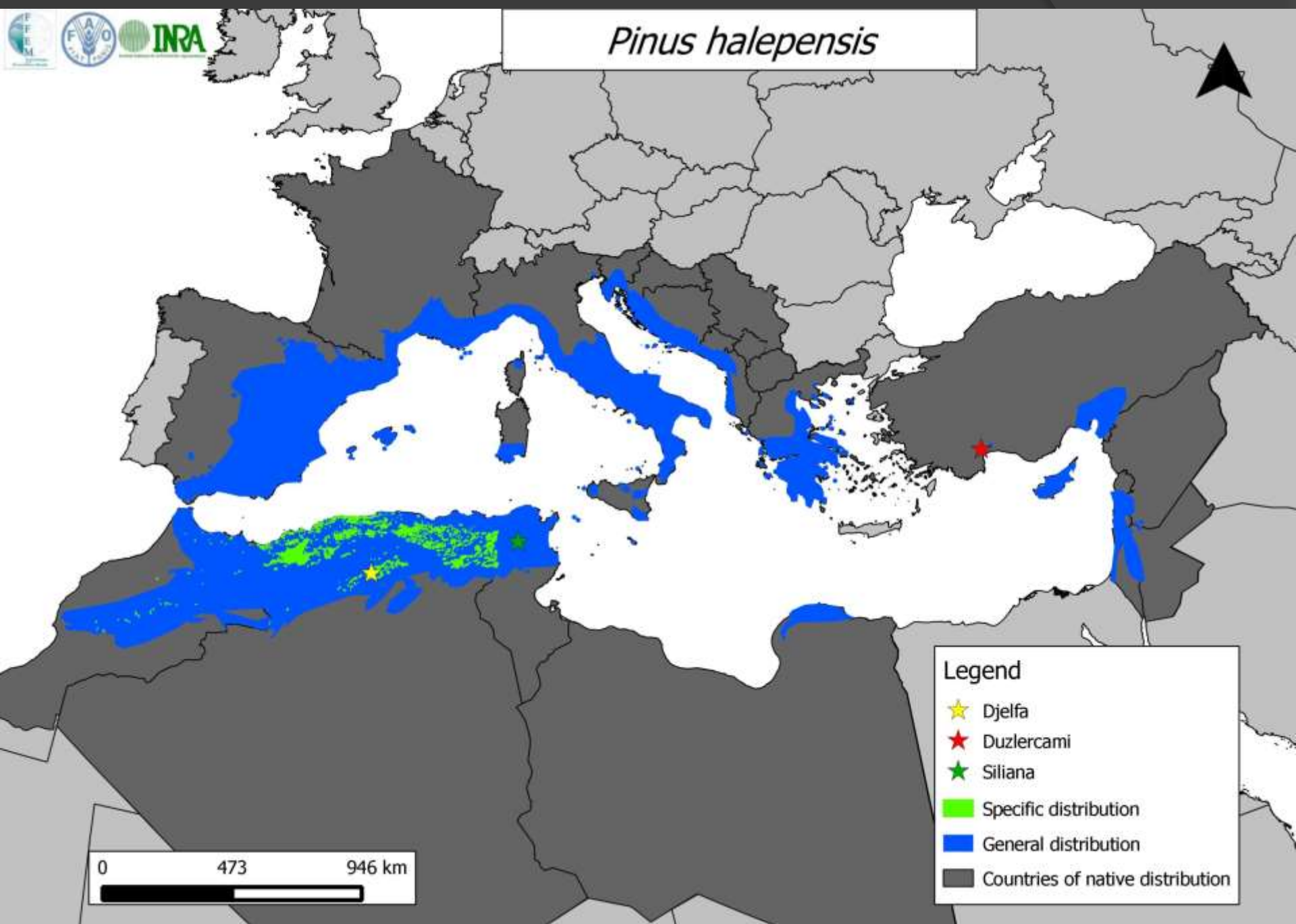
Pinus brutia



Legend

- ★ Duzlercami
- ★ Jabal Moussa
- Specific distribution
- General distribution
- Countries of native distribution

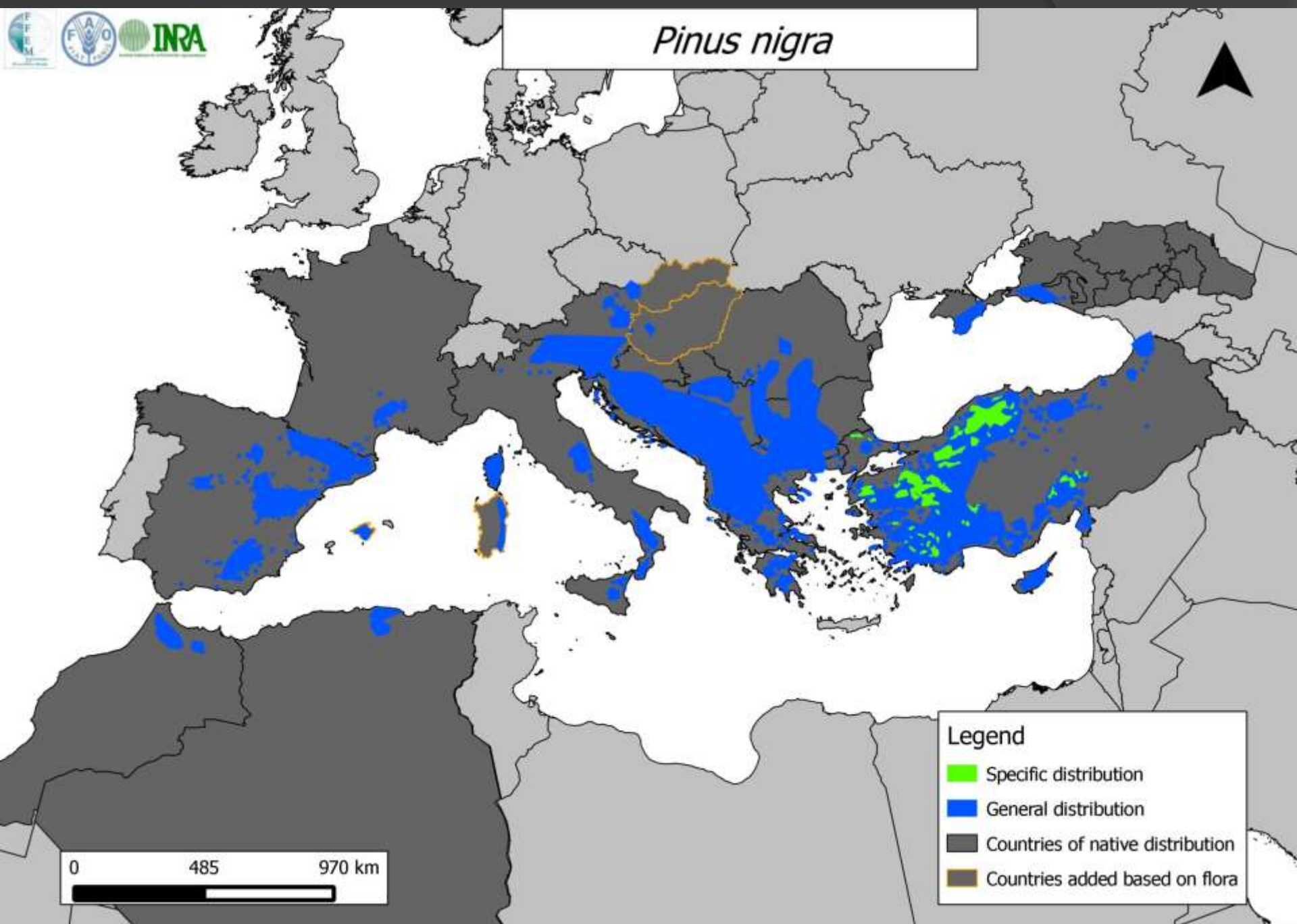
Pinus halepensis



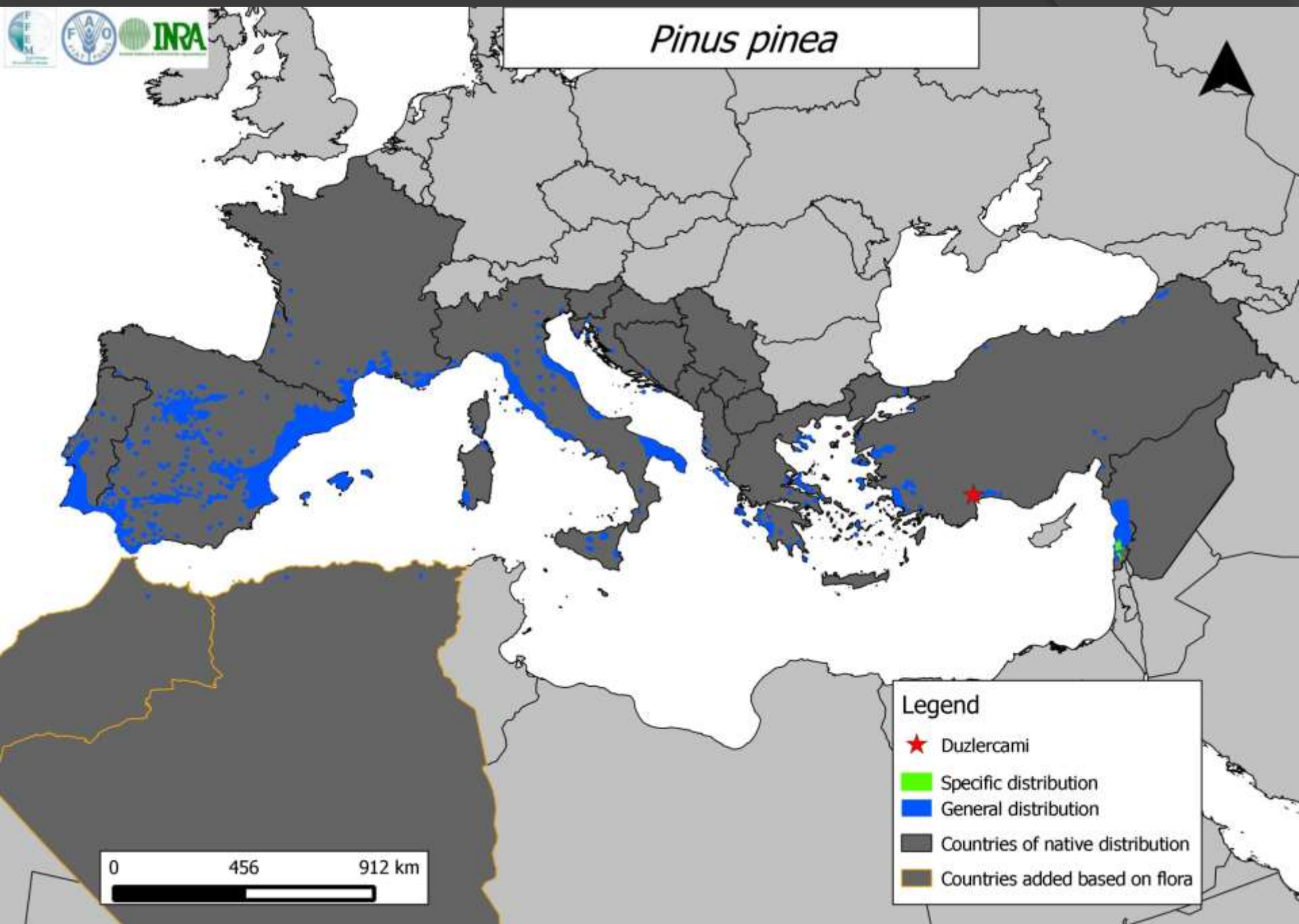
Legend

- ★ Djelfa
- ★ Duzlercami
- ★ Siliana
- Specific distribution
- General distribution
- Countries of native distribution

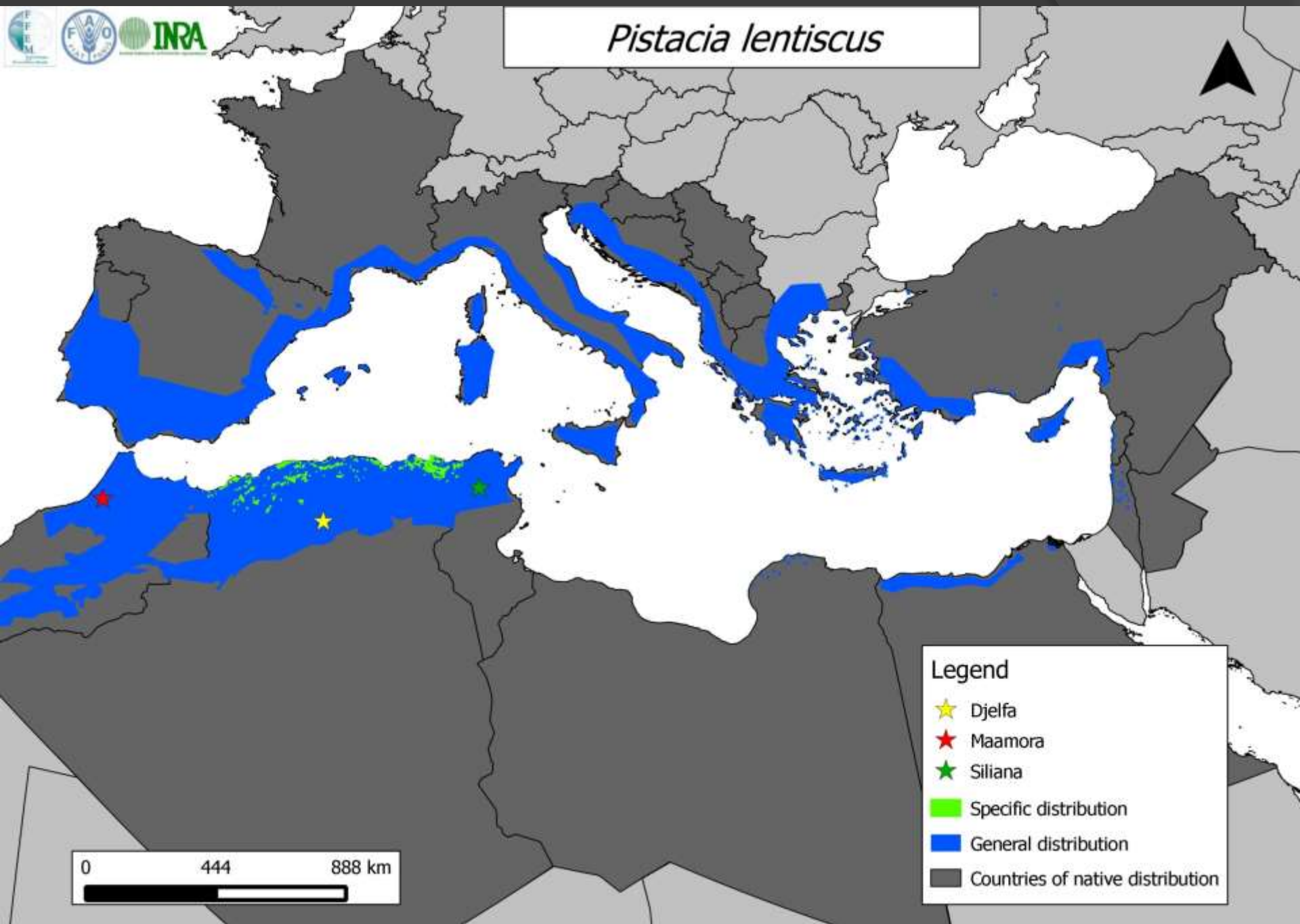
Pinus nigra



Pinus pinea



Pistacia lentiscus

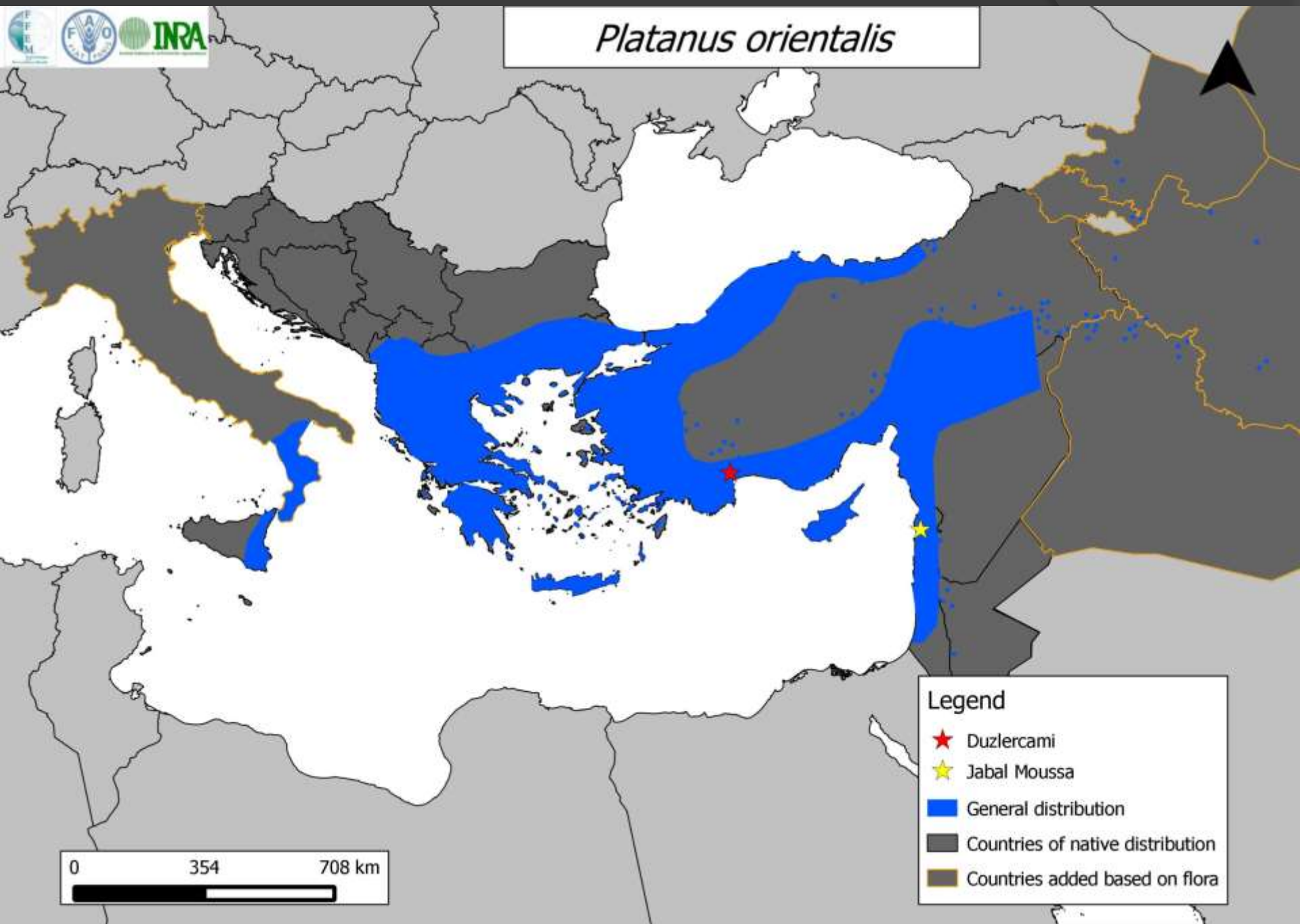


0 444 888 km

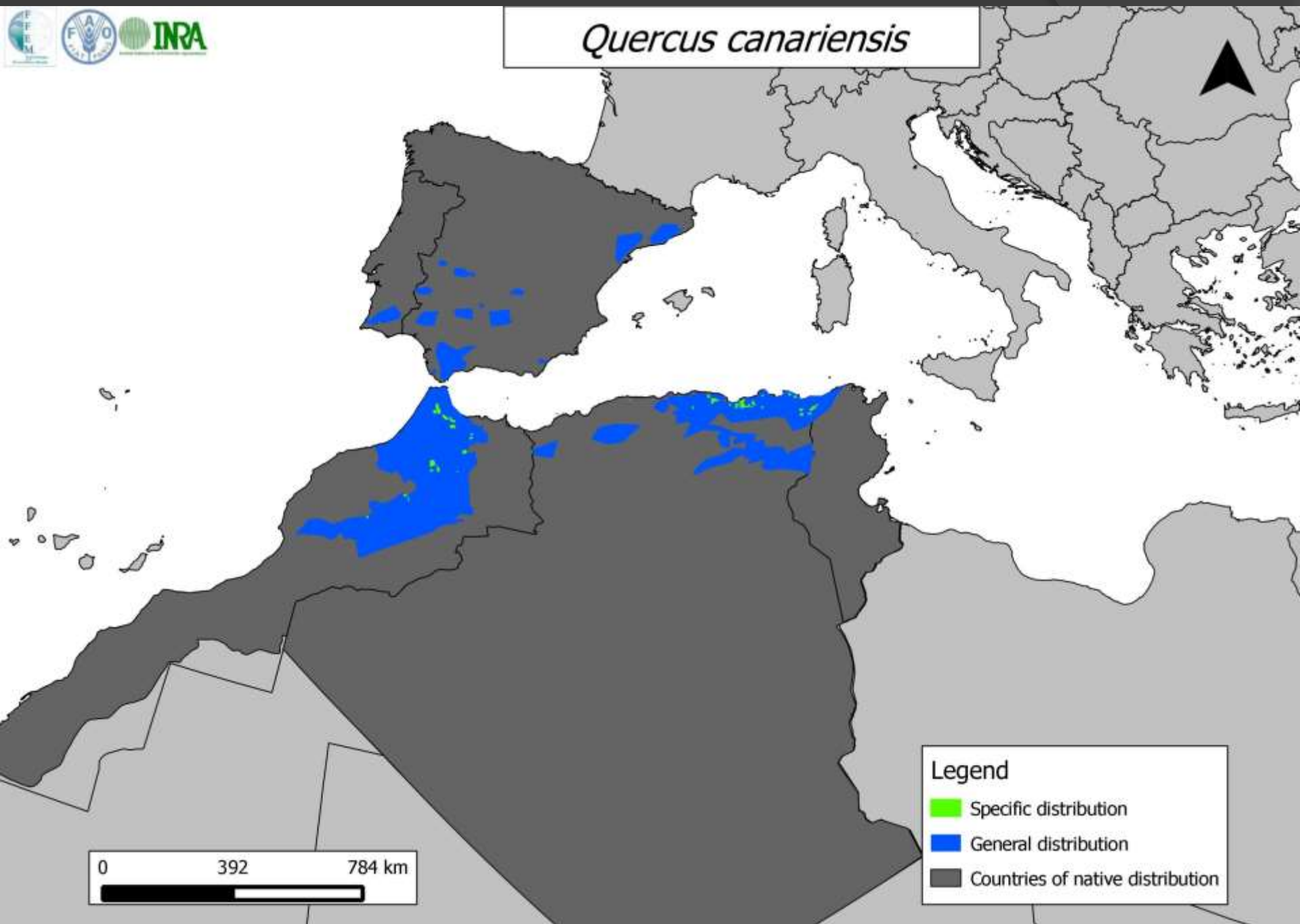
Legend

- ★ Djelfa
- ★ Maamora
- ★ Siliana
- Specific distribution
- General distribution
- Countries of native distribution

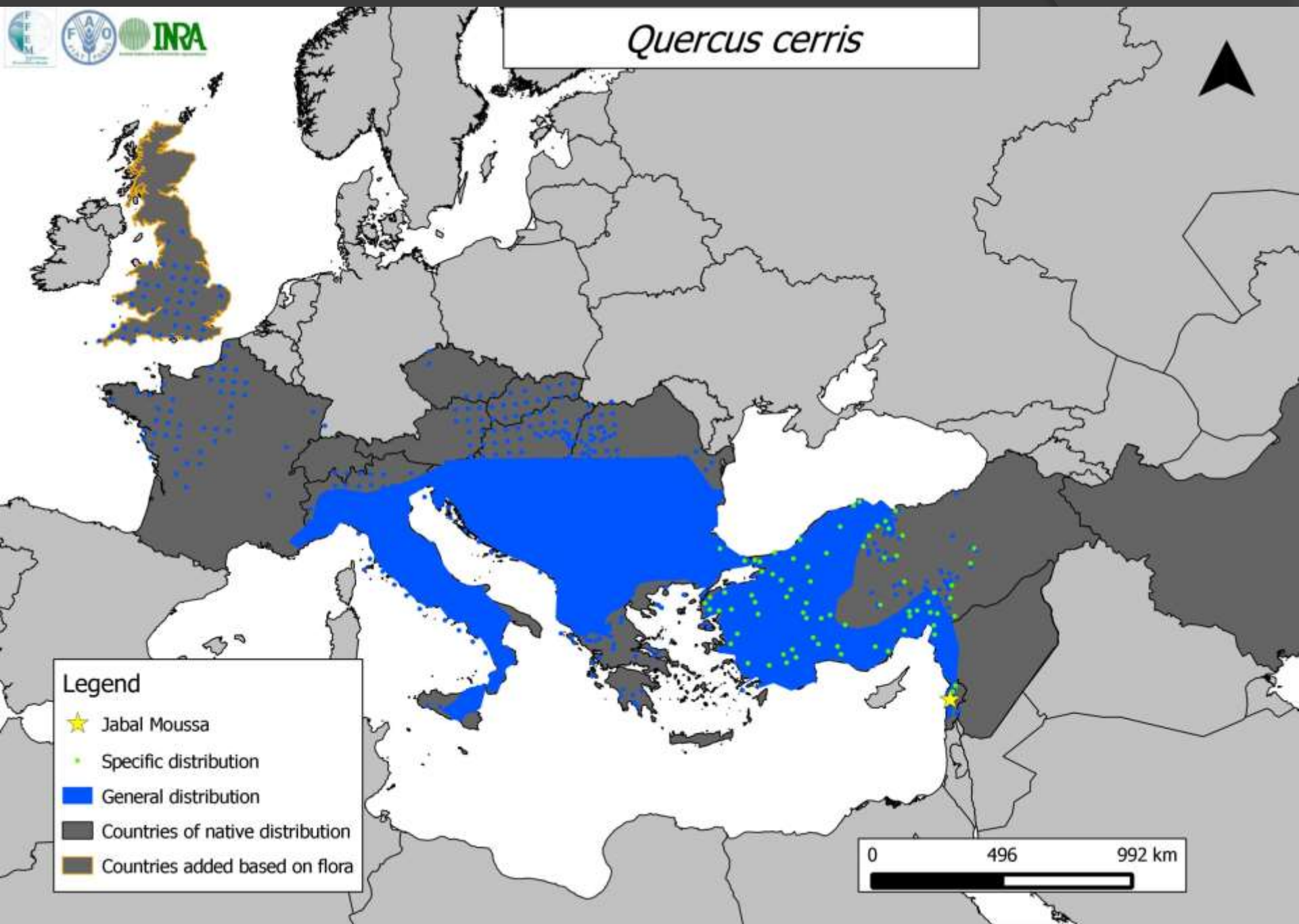
Platanus orientalis



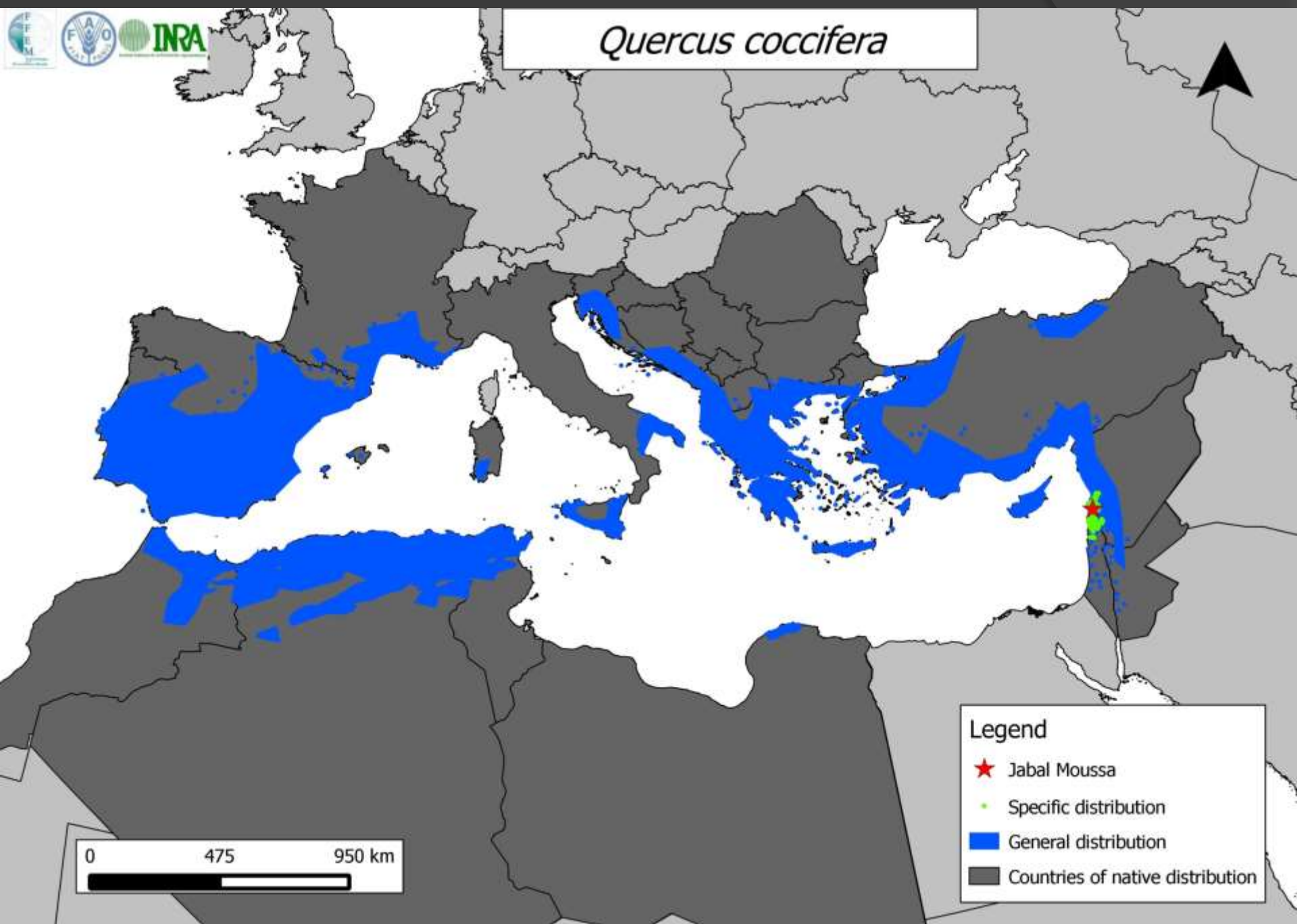
Quercus canariensis



Quercus cerris



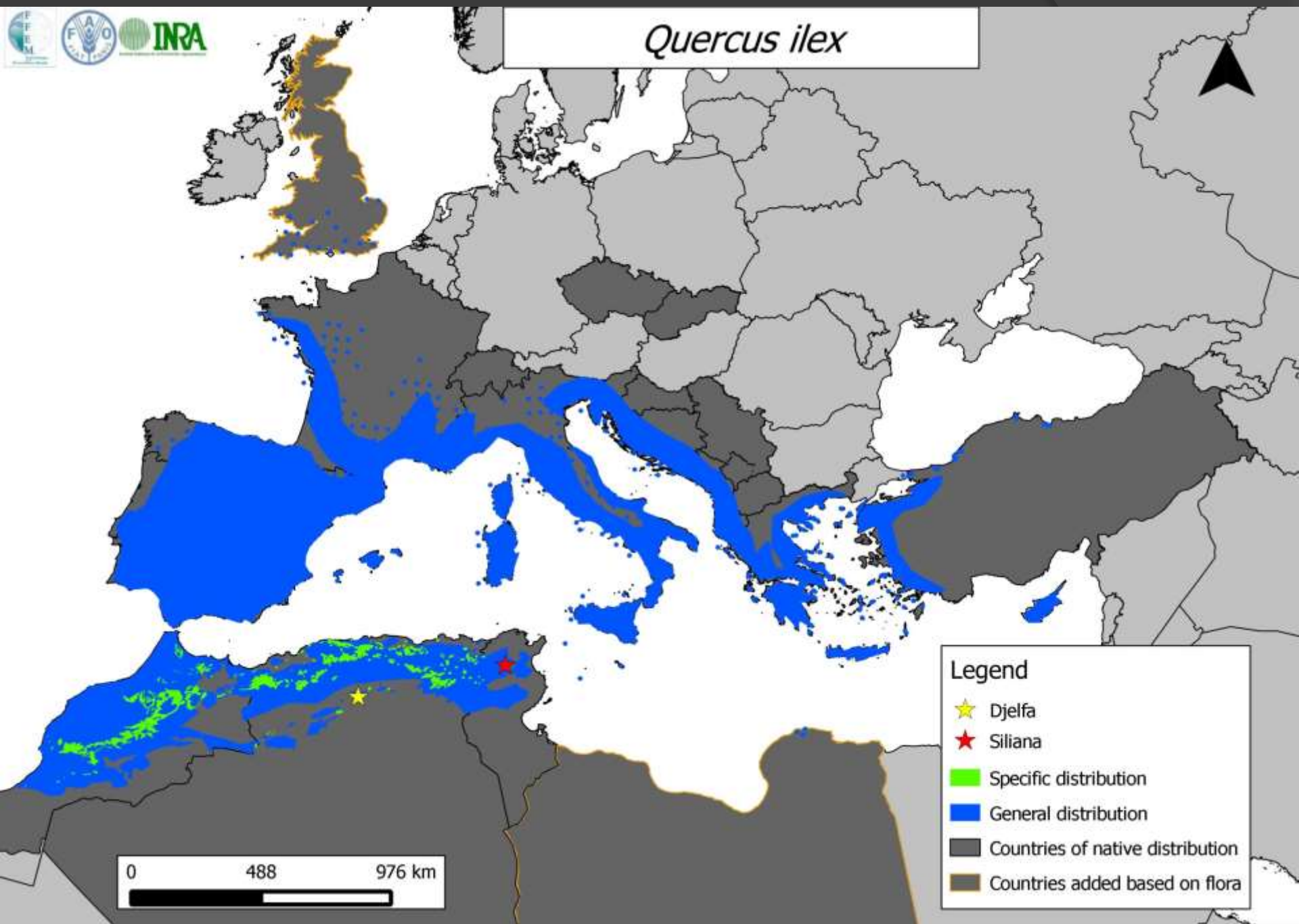
Quercus coccifera



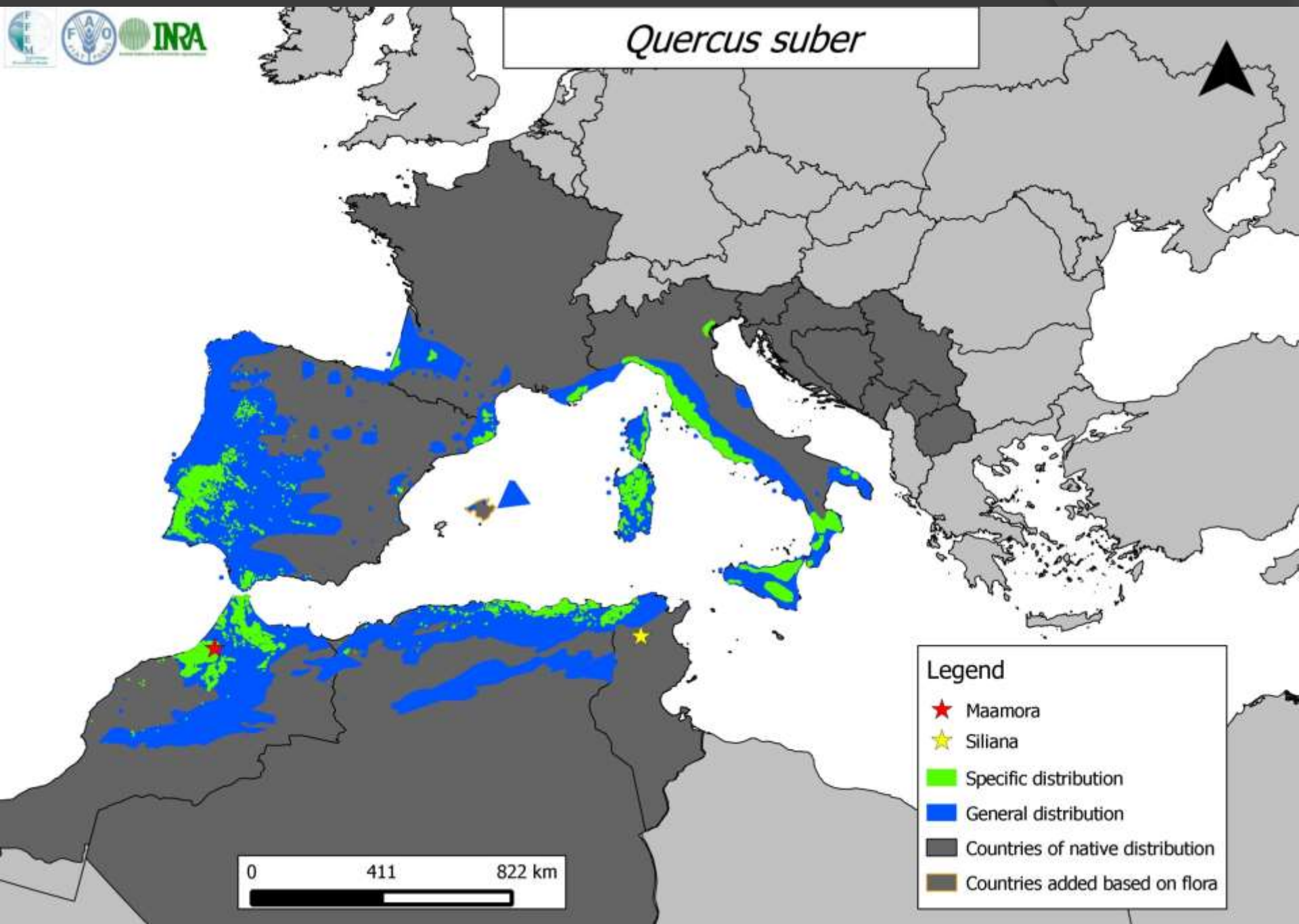
Legend

- ★ Jabal Moussa
- Specific distribution
- General distribution
- Countries of native distribution

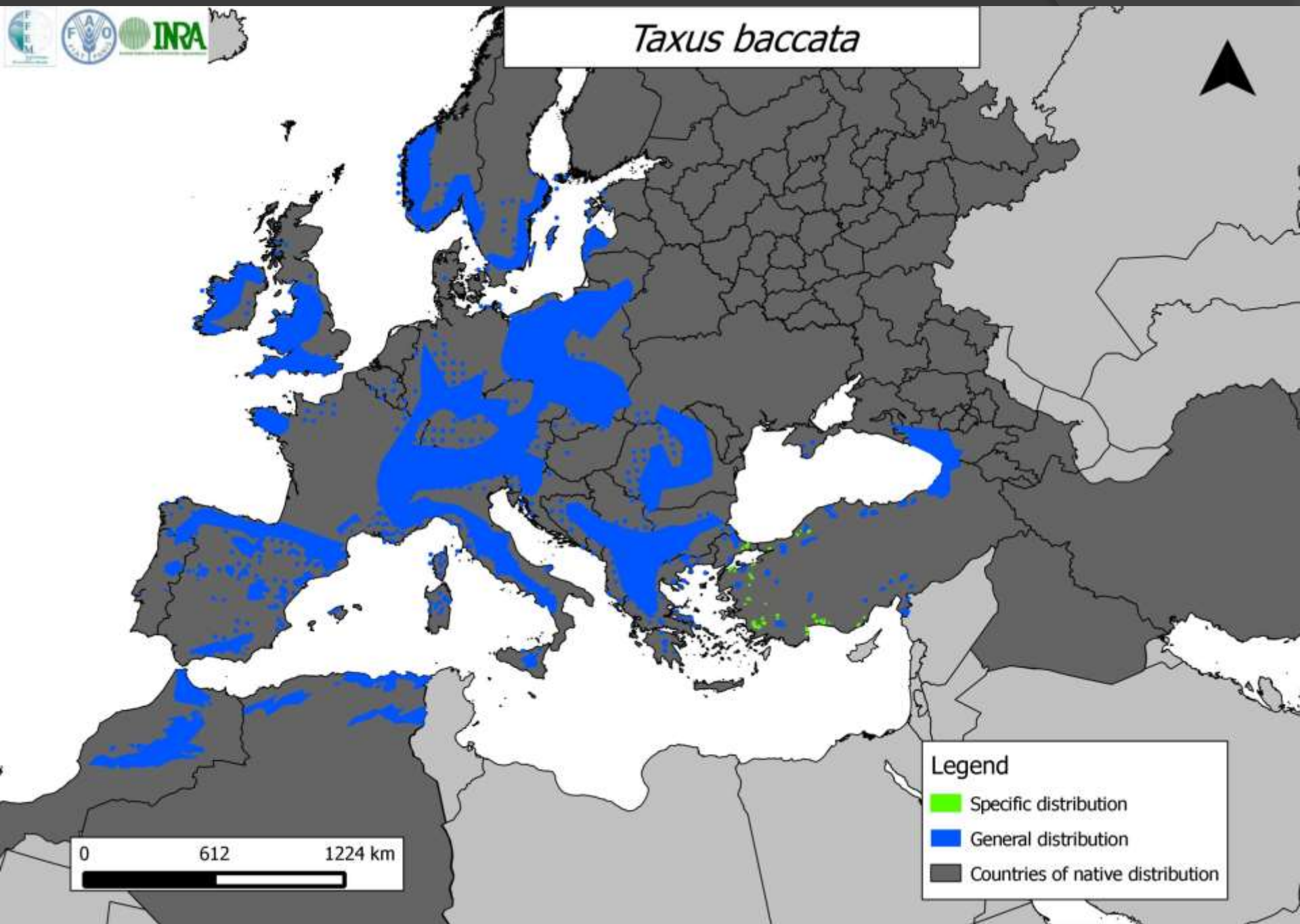
Quercus ilex



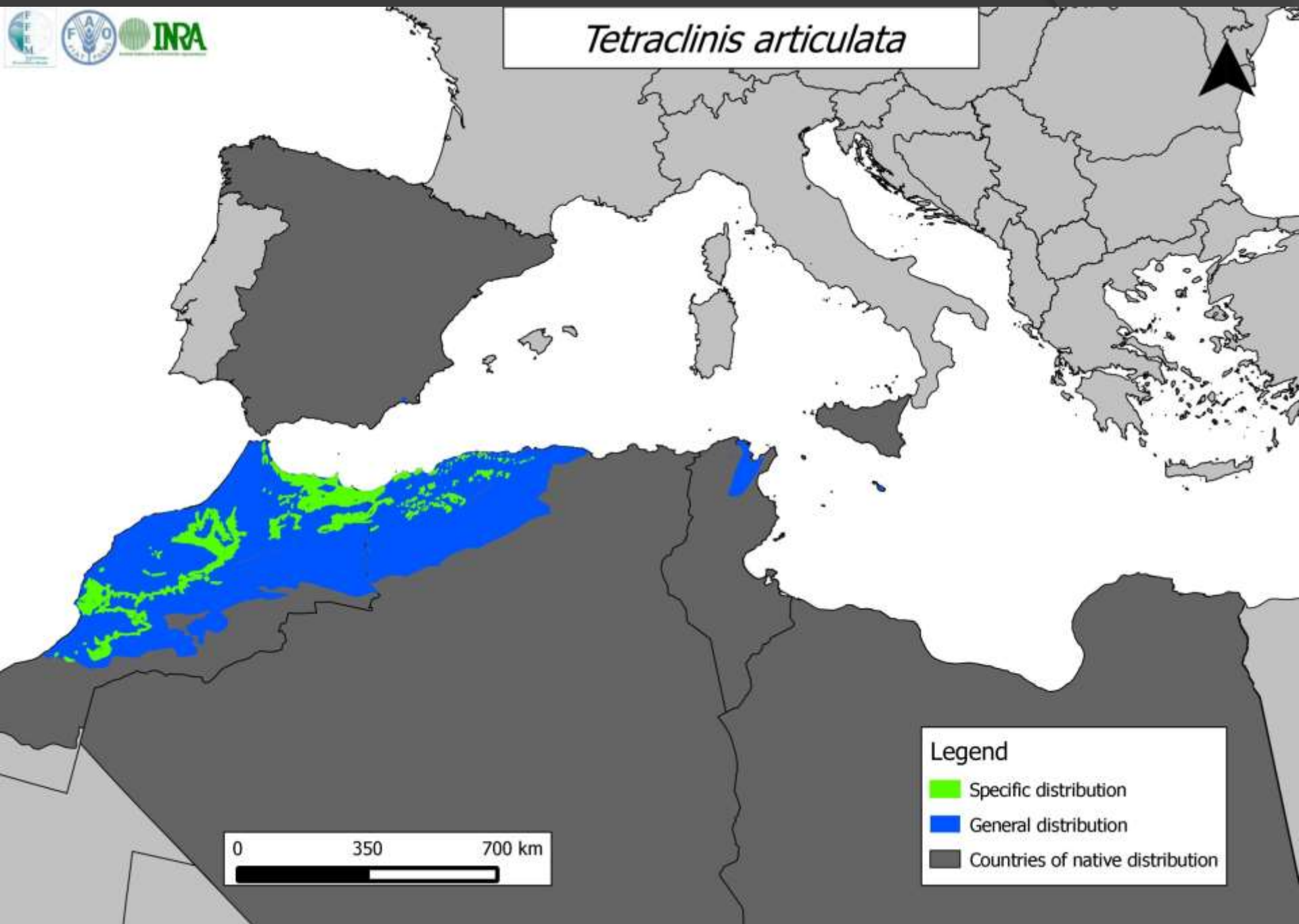
Quercus suber






Taxus baccata



Tetraclinis articulata



Legend

-  Specific distribution
-  General distribution
-  Countries of native distribution

Limitation and challenges

The different types of data compiled throughout this work provided in themselves a challenge to

- be used together on one map,
- show information as accurate as possible.

1- Compiling maps with data of different accuracy.

- Data that showed points of occurrence based on grids
- Data that provides information on the specific area of presence of the species (ex: maps from scientific publications)
- Data that provides more of a general information, showing an area where it is highly likely to come across the species (ex: the Catalan flora).
- Data that describe, in a text, the species as present in a certain area, and the only map would be the map of the country divided into areas.

Limitation and challenges

2- Compiling data from maps published in different decades (Emberger 1936, IDAF 2013)

3- Difficulty in georeferencing and digitizing maps that were hand-drawn initially

4- Some accurate data in small areas or countries (e.g. islands, Lebanon) couldn't be valorized appropriately because the maps were on the Mediterranean scale. At the same time, whenever we digitized a map on the Mediterranean scale, the points or polygons created for these small areas were only "accurate" at that scale, making it impossible to accurately use them on the country, or island's scale

5- Different Genus or species name for the species that interest us, considering that some of these maps are more than 50 years old. For example in some references *Tetraclinis articulata* was described as *Callitris articulata*, also *Quercus canariensis* was described as *Quercus faginea*, (zeen oak).

GEOGRAPHICAL MARGINALITY

We classified the populations as either

- MARGINAL (in the 5% outer rim of distribution)
- CENTRAL (in the middle)
- DISJOINT (separated from the core by at least 50km).

The status of each site was decided **visually** using the **maps produced** in the project

Classification could be different based on scale and data quality (general or specific)

| Species name (in pilot site) | Accepted name (in Catalogue of Life) | COMMON NAME/NOM COMMUN | DUZLERCAMI TURKEY | DJELFA ALGERIA | JABAL MOUSSA LEBANON | MAAMORA MOROCCO | SILIANA TUNISIA |
|------------------------------|--|--|-------------------|----------------|----------------------|------------------|------------------|
| Acer tauricum | Acer hyrcanum subsp. tauricum (Boiss. & Balansa) Yalt. | Taurus Maple/Érable du Taurus | | | MARGINAL | | |
| Arbutus unedo | Arbutus unedo L. | Strawberry tree/Arbousier | | | | | MARGINAL/CENTRAL |
| Cedrus libani | Cedrus libani A. Rich. | Cedar of Lebanon-Taurus_Cedar/Cèdre du Liban | MARGINAL/CENTRAL | | | | |
| Chamaerops humilis | Chamaerops humilis L. | Mediterranean dwarf palm/Palmier nain | | | | MARGINAL/CENTRAL | |
| Juniperus drupacea | Juniperus drupacea Labill. | Syrian juniper/Genévrier de Syrie | | | MARGINAL | | |
| Juniperus excelsa | Juniperus excelsa M.-Bieb. | Greek juniper/Genévrier grec | CENTRAL | | | | |
| Juniperus oxycedrus | Juniperus oxycedrus L. | Prickly juniper/Genévrier oxycèdre | | CENTRAL | | | |
| Juniperus phoenicea | Juniperus phoenicea L. | Phoenician juniper/Genévrier rouge | | CENTRAL | | | |

| Species name (in pilot site) | Accepted name (in Catalogue of Life) | COMMON NAME/NOM COMMUN | DUZLERCAMI TURKEY | DJELFA ALGERIA | JABAL MOUSSA LEBANON | MAAMORA MOROCCO | SILIANA TUNISIA |
|---------------------------------|---|---------------------------------------|----------------------|-------------------|-------------------------|--------------------|--------------------|
| Pinus brutia | Pinus brutia Ten. | Turkish pine/Pin de Calabre | CENTRAL | | CENTRAL | | |
| Pinus halepensis | Pinus halepensis Mill. | Aleppo pine/Pin d'Alep | DISJOINT | CENTRAL | | | CENTRAL |
| Pinus pinea | Pinus pinea L. | Stone pine/Pin pignon | MARGINAL | | | | |
| Pistacia lentiscus | Pistacia lentiscus | Mastic tree/Lentisque | | CENTRAL | | CENTRAL | CENTRAL |
| Platanus orientalis | Platanus orientalis L. | Oriental plane/Platane d'Orient | CENTRAL | | CENTRAL | | |
| Quercus calliprinos | Quercus coccifera L. | Kermes oak/Chêne kermès | | | CENTRAL /MARGINAL | | |
| Quercus cerris | Quercus cerris L. | Turkey oak/Chêne de Turquie | | | MARGINAL | | |
| Quercus ilex | Quercus ilex L. | Holm oak/Chêne vert | | MARGINAL | | | CENTRAL |
| Quercus suber | Quercus suber L. | Cork oak/Chêne liège | | | | CENTRAL | DISJOINT |

Mapping Mediterranean tree species from published references and databases: challenges and outcomes.

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Thank you for your attention

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