

EXTERNAL SCIENTIFIC REPORT

Extensive literature search for preparatory work to support pan European pest risk assessment: Trichilogaster acaciaelongifoliae.¹

RC/EFSA/ALPHA/2014/07

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Suggested citation: M.P.M. Derkx, J.H.D. Brouwer, P.J.M. van Breda, H.H.M. Helsen, M.H.A. Hoffman and M.E.C.M. Hop, 2014. Extensive literature search for preparatory work to support pan European pest risk assessment: Trichilogaster acaciaelongifoliae. EFSA supporting publication 2015:EN-764, 71 pp.

Available online: www.efsa.europa.eu/publications

¹ Question No EFSA-Q-2014-00618.



ABSTRACT

EFSA has to assess the risk to plant health that would pose a voluntary release of the bud galling wasp Trichilogaster acaciaefoliae in the Union territory for the biological control of the invasive alien plant Acacia longifolia (Andrews) Willd. As a preparatory work for this pan European pest risk assessment an inventory is developed on the ornamental cultivation of Acacia longifolia and Acacia floribunda in the EU. A. longifolia and A. floribunda are both hosts of the bud galling wasp Trichilogaster acaciaefoliae. The inventory demonstrated that Acacia floribunda (Vent.) Willd. is not distributed as invasive plant or environmental in European member states. For cultivation as ornamental it is only available at a very small scale in France and Italy. Acacia longifolia is one of the most prolific invaders in France, Italy, Portugal and Spain. A. longifolia has not been recorded in the wild in any other EU member state. A. longifolia is a quite commonly used shrub or tree in the subtropical parts of Europe. It can be used as an ornamental shrub or small tree in gardens, in cities and in agricultural areas. As ornamental tree it is not only present in Southern Europe, but also in Belgium and UK. The species is grown by quite some nurseries in Italy, France, Spain and Greece. In Portugal it is prohibited by law to cultivate this species. The presented results on occurrence in the wild and cultivation of A. longifolia and A. floribunda in EU member states are a good basis to assess the risk to plant health that would pose a voluntary release of the bud galling wasp Trichilogaster acaciaefoliae in the Union territory for the biological control of the invasive alien plant Acacia longifolia (Andrews) Willd.

KEY WORDS

Acacia floribunda, Acacia longifolia, Acacia spp., Distribution, Europe, Ornamental, Trichilogaster acaciaelongifoliae



SUMMARY

EFSA has to assess the risk to plant health that would pose a voluntary release of the bud galling wasp *Trichilogaster acaciaefoliae* in the Union territory for the biological control of the invasive alien plant *Acacia longifolia* (Andrews) Willd. As a preparatory work for this pan European pest risk assessment an inventory is developed on the ornamental cultivation of *Acacia longifolia* and *Acacia floribunda* in the EU. *A. longifolia* and *A. floribunda* are both hosts of the bud galling wasp *Trichilogaster acaciaefoliae*. *A. floribunda* (Vent.) Willd is closely related to *A. longifolia* and has earlier been considered as a subspecies. The inventory was developed by means of extensive literature searches. In addition information was collected on distribution in the wild and cultivation of some other *Acacia* species, mainly *A. dealbata*, *A. melanoxylon*, *A. retinodes* and *A. saligna*. These species are also invasive in several EU member states. They are not hosts of *Trichilogaster acaciaefoliae*.

The inventory demonstrated that *Acacia floribunda* (Vent.) Willd. is not distributed as invasive plant or environmental in European member states. It does not appear in any botanical source or database on invasive plants. The species is available as ornamental in Southern Europe, however on a very small scale. Few nurseries in France and Spain offer the true to name *A. floribunda* (Vent.) Willd for use as ornamental shrub in gardens, in cities and in agricultural areas. The name *A. floribunda* is often used in Europe for ornamental Acacias. However, these plants are not true to name; the valid name of these plants is *A. retinodes* Schltdl. Based on descriptions and pictures of plants it turned out that in most cases plants offered under the name *A. floribunda* are in fact *A. retinoides* Schltdl.

Acacia longifolia is one of the most serious invaders in France, Italy, Portugal and Spain. It is the most prominent and widespread invader in Portuguese dunes. The species occurs in most provinces in Portugal, in the north western part of Spain, in some southern parts of France and in parts of Italy. It was not only recorded on the mainland, but also on the islands of Corse, Azores, Madeira, Baleares and Sardinia. Detailed data on areas are not available, with a few exceptions, e.g. in the coastal region of Portugal 2850 ha of A. longifolia is recorded between Pedrogão and S. Jacinto (= 12% of the 24,000 ha coastal strip). A. longifolia was not recorded in the wild in any other EU member state.

Acacia longifolia is a quite commonly used shrub or tree in the subtropical parts of Europe. The species is grown by quite some nurseries in Italy, France, Spain and Greece. In Portugal it is prohibited by law to cultivate this species, as is also the case for A. dealbata, A. melanoxylon, A. retinodes and A. saligna. Moreover A. longifolia it is grown by some nurseries in more northern parts of Europe (Germany, the Netherlands, Irish Republic and UK). A. longifolia can be used as an ornamental shrub or small tree in gardens, in cities and in or agricultural areas. As such it is not only present in southern Europe, but also in Belgium and UK. The species is also used in natural areas, e.g. for soil-stabilization in dunes (erosion control).

The Acacias grown in France and Italy for cut flower production principally are *A. dealbata* and *A. retinodes*, of which *A. dealbata* is the most important. In 2000 the total production area of *Acacia* spp. in Italy was 552 ha, of which 500 ha was in Imperia. The area dropped dramatically thereafter due to pest problems, particularly *Acizzia uncatoides* (synonym *Psylla uncatoides*). In France the total production area dropped from 204 ha in 2002 to 112 ha in 2011. The production is biggest in Alpes Maritimes and Var. In addition, 150-200 tonnes of Acacia blossoms are collected in the wild for the production of high-grade perfume. *A. dealbata* is often planted in gardens, parks and along the roadside. *A. retinodes* is also used as ornamental tree and as an environmental. Many varieties and cultivars are on the market, especially from *A. dealbata*.

Both species are invasive. A. dealbata is one of the most prolific invaders in Portugal, Spain, Italy and France. It occurs in all provinces in Portugal, in the north western part of Spain, and in quite some areas in France and Italy. A. dealbata was also recorded in Croatia, Cyprus, Romania, Sweden and the non EU member state Switzerland.



Acacia retinodes was recorded in the wild in big parts of Portugal and in some parts of Italy and France. It was not recorded in Spain. Other countries were the species is recorded in the wild include Croatia, Cyprus, Romania and the UK.

Acacia melanoxylon is also one of the most prolific invaders in France, Italy, Portugal and Spain. It occurs in all provinces in Portugal, in the north western part of Spain, in the south eastern part of France and in some parts of Italy. It was also recorded in Belgium and the UK. A. melanoxylon can be used as an ornamental in gardens and parks. It is also used as a street tree. In Portugal its wood is used for timber.

Acacia saligna is the most invasive Acacia species in Italy. It is present in nine regions in Italy, including Sicily and Sardinia, in big parts of Portugal, in the south eastern part of France, including Corse and in North-West Spain. A. saligna is also present in Croatia, Cyprus, Greece and Malta. In Cyprus it is the most serious invasive species and in Malta it is one of the major plant invaders. A. saligna is used as an ornamental. Other uses include environmental rehabilitation, soil stabilisation, animal fodder, tannin production, windbreaks, and source of fuel wood.

Several pests and diseases affect *Acacia* species.Important pests include *Acizzia uncatoides* (syn. *Psylla uncatoides*), aphids, *Frankliniella occidentalis* (thrips), *Metcalfa pruinosa* and cotton scale. The major pathogen is *Armillaria mellea*, which is difficult to control. Pest problems are the main reason for serious reductions in cultivation areas, both in Italy and in France.

Egg laying of *Trichilogaster acaciaefoliae* has also been observed on the tree *Paraserianthes lophantha*, which has its origin in Australia. Therefore a small inventory was done on the distribution and cultivation of *P. lophantha* in EU member states. *P. lophantha* is present in the wild in some regions/provinces in Italy and Portugal, in the South Eastern part of France and in Spain. The species is cultivated as ornamental, both in Southern Europe and in Western Europe, probably on a limited scale.

The presented results on occurrence in the wild and cultivation of *A. longifolia* and *A. floribunda*, - which are both hosts of the bud galling wasp *Trichilogaster acaciaefoliae* - in EU member states are a good basis to assess the risk to plant health that would pose a voluntary release of the bud galling wasp *Trichilogaster acaciaefoliae* in the Union territory for the biological control of the invasive alien plant *Acacia longifolia* (Andrews) Willd.



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BACKGROUND AS PROVIDED BY EFSA

In the context of a request by the European Union EFSA has to assess the risk to plant health that would pose a voluntary release of the bud galling wasp *Trichilogaster acaciaefoliae* in the Union territory for the biological control of the invasive alien plant *Acacia longifolia* (Andrews) Willd. This pest risk assessment is to be conducted under the scenario assumption of a voluntary release of *Trichilogaster acaciaefoliae*. Therefore it should focus on the risk of establishment, spread and impact for the EU territory, excluding the assessment of the probability of entry and a systematic evaluation of risk reduction options.

TERMS OF REFERENCE AS PROVIDED BY EFSA

This procurement is launched in the context of the multiple Framework Contract OC/EFSA/PLH/2013/01-CT1-5. The main objective of this procedure is to provide preparatory work for the Panel on Plant Health in the context of the request from the EC to provide a scientific opinion on the risks to plant health posed by the release of *T. acaciaelongifoliae* as biocontrol agent of the invasive plant *Acacia longifolia*.

The specific objectives of the contract resulting from the present reopening competition are to develop the following inventory by means of extensive literature searches following the methodology described in the EFSA guidance on systematic review¹.

Inventory on *Acacia longifolia* and *Acacia floribunda* in the EU. For each species, the contractor shall indicate:

- their area (ha) of occurrence in the wild in each EU member state,
- their area (ha) of cultivation in each EU member state,
- their intended ornamental use (flowers vs. leaves),
- the hybrids and varieties on the ornamental market,
- what pest management regimes are undertaken by ornamental growers as a matter of course,
- the source of the ornamental product (i.e. field collected or nursery grown from seed/cutting, etc.).

The extensive literature search shall be based on both peer-reviewed and grey literature (technical reports, EU member states data, information provided by National Plant Protection Organizations and horticultural surveys). It should be kept in mind that in the technical literature, *Mimosa* is often used as a synonym for *Acacia*.

This contract/grant was awarded by EFSA to:

Stichting Dienst Landbouwkundig Onderzoek Droevendaalsesteeg 1 6708 PB Wageningen The Netherlands

Contact person: Dr. ir. M.P.M. Derkx, tel +31 252 462188, ria.derkx@wur.nl



Contract/grant title: Extensive literature search for preparatory work to support pan European pest risk assessment: *Trichilogaster acaciaelongifoliae*

Contract/grant number: RC/EFSA/ALPHA/2014/07



1. Introduction and Objectives

EFSA is requested by the European Commission to assess the risk to plant health that would pose a voluntary release of the bud galling wasp *Trichilogaster acaciaefoliae* in the Union territory for the biological control of the invasive alien plant *Acacia longifolia* (Andrews) Willd. This pest risk assessment is to be conducted under the scenario assumption of a voluntary release of *Trichilogaster acaciaefoliae*. Therefore it should focus on the risk of establishment, spread and impact for the EU territory, excluding the assessment of the probability of entry and a systematic evaluation of risk reduction options.

As a preparatory work for this pan European pest risk assessment an inventory is developed on the ornamental cultivation of *Acacia longifolia* and *Acacia floribunda* in the EU. *A. longifolia* and *A.floribunda* are both hosts of the bud galling wasp *Trichilogaster acaciaefoliae*. *A. floribunda* (Vent.) Willd is closely related to *A. longifolia* and has earlier been considered as a subspecies (Maslin, 2001). The inventory was developed by means of extensive literature searches following the methodology described in the EFSA guidance on systematic review http://www.efsa.europa.eu/en/efsajournal/doc/1637.pdf.

Study questions were:

- Which common names and synonyms are in use for both species under study?
- What is the distribution of both species within the European Union and the occurrence (ha) in the wild in each EU member state?
- What is the area of cultivation of both species for ornamental use, both for landscape/urban use and cut foliage/cut flower/container plant in each EU member state?
- Which ornamental uses are intended (flowers vs. leaves) in the European Union?
- Which hybrids and varieties are on the ornamental market in the European Union?
- Which pests occur in the species under study?
- Which pest management regimes are undertaken by ornamental growers in the European Union
- What is the source of the ornamental product: field collected, nursery grown from seed, nursery grown from cutting, etc. ?

In addition information was collected on distribution in the wild and cultivation of some other *Acacia* species, mainly *A. dealbata*, *A. melanoxylon*, *A. retinodes* and *A. saligna*. These species are also invasive in several EU member states. They are not hosts of *Trichilogaster acaciaefoliae*.

Data and information were retrieved by a systematic, extensive and reproducible literature search in different databases, such as CAB Abstracts. Moreover, several invasive species databases were searched. In addition, websites from relevant organisations, like regional/national authorities, plant protection organizations, national floras, The Dutch Flower Auctions Association VBN, nurseries, organizations in relation to ornamentals, and national libraries were searched. Searches were done in relevant Member States of the European Union. Moreover, experts in different EU member states were consulted, both experts on invasive species and experts on ornamentals.

The findings of these searches were collected in an Excel-file and the references were collected in the reference management programme EndNote.

2. MATERIALS AND METHODS

2.1 Search strategies

Different search strategies were developed for CAB Abstracts, AGRIS, Scopus and Zoological record. These are shown in tables 1-4.



CAB Abstracts

In relation to common names and synonyms it was checked which names resulted in hits. An overview of all checked names and the numbers of hits in CAB Abstracts is given in appendix A. Names which resulted in hits were included in the search strategy. Searching was done on EU Member State names (28), including former names, like Czechoslovakia, and German Democratic Republic and on European Union. The CAB Thesaurus 2014 was used to find terms, specific terminology and synonyms (http://www.cabi.org). Boolean operators used are AND, OR. Truncation (*) was used to retrieve all possible suffix variations of the root word indicated. The wild card character? was used to substitute for one or no characters. The explode command was used in CAB's hierarchal list of thesaurus terms. It tells OvidSP to search for the thesaurus term itself including all its narrower terms, down to all levels (http://www.cabi.org/?page=2044&site=170 Advanced Searching of CAB Abstracts, p. 25, 28-29). The search in CAB Abstracts was done from 1984 onward and resulted in 165 hits.

Table 1: Search strategy in CAB Abstracts.

20141030

- 1 ((acacia or acacias or mimosa or mimosa or phyllodoce) and (dealbata or floribunda or latifolia or longifolia or macrostachya or melanoxyl?? or retinodes or saligna)) or acacia cyanophyll* or coast wattle? or golden wattle? or long leaved wattle? or racosperma floribundum or racosperma longifolium or silver wattle?
- 2 ((alien or exotic? or introduced or invad* or invasi* or non indigenous or nonindigenous or non native* or nonnative*) and (acacia or acacias or mimosa or mimosas))
- 3 1 or 2
- 4 trichilogaster
- 5 exp european union/ or exp european union countries/ or czechoslovakia.hw or estonian ssr.hw or latvian ssr.hw or lithuanian ssr.hw or german democratic republic.hw or german federal republic.hw or croatia.ti,ab,hw or (portugal or spain or france or italy or slovenia or croatia or greece or cyprus).ti,ab
- 6 (3 or 4) and 5

AGRIS

In relation to common names and synonyms it was checked which names resulted in hits. An overview of all checked names and the numbers of hits in AGRIS is given in appendix 1. Names which resulted in hits were included in the search strategy. The AGROVOC Thesaurus was used to find terms, specific terminology and synonyms. Boolean operators used are AND, OR. Truncation (*) was used to retrieve all possible suffix variations of the root word indicated. The wild card character? was used to substitute for one or no characters. The search in AGRIS was done from 1975 onward and resulted in 36 hits.



Table 2: Search strategy in AGRIS.

20141105:

1 ((acacia or acacias or mimosa or mimosa or phyllodoce) and (dealbata or floribunda or latifolia or longifolia or macrostachya or melanoxyl?? or retinodes or saligna)) or acacia cyanophyll* or coast wattle? or golden wattle? or long leaved wattle? or racosperma floribundum or racosperma longifolium or silver wattle?

2 ((alien or exotic? or introduced or invad* or invasi* or non indigenous or nonindigenous or non native* or nonnative*) and (acacia or acacias or mimosa or mimosas))

3 1 or 2

4 trichilogaster

5 3 or 4

6 (austria or belgium or bulgaria or cyprus or croatia or czech republic or czechoslovakia or csfr or denmark or estonia or european union or finland or france or "federal republic of germany" or german democratic republic or germany or greece or hungary or irish republic or (ireland not northern ireland) or italy or latvia or lithuania or luxembourg or malta or netherlands or poland or portugal or romania or slovakia or slovak republic or slovenia or spain or sweden or uk or great britain or united kingdom or scotland or wales or england or northern ireland).ti,ec,ie,ei,gc or exp austria or exp belgium or exp bulgaria or exp croatia or exp cyprus or exp czech republic or exp czechoslovakia or exp denmark or exp estonia or exp finland or exp france or exp germany or exp greece or exp hungary or exp ireland or exp irish republic or exp italy or exp latvia or exp lithuania or exp luxembourg or exp malta or exp netherlands or exp poland or exp portugal or exp romania or exp slovak republic or exp slovakia or exp slovenia or exp spain or exp sweden or exp great britain or exp united kingdom or exp england or exp scotland or exp wales or exp northern ireland or exp european union or exp european union countries or (portugal or italia or italy or france or spain or espana or slovenia or croatia or greece or ellada or cyprus).ti,az

7.5 and 6

Scopus

Boolean operators used are AND, OR. Scopus finds singular and plural form of nouns automatically. Truncation (*) was used to retrieve all possible suffix variations of the root word indicated. Sometimes terms were enclosed in quotes (""), which means that the exact phrase is being searched (http://www.info.sciverse.com/scopus/). Scopus covers records from 1996 onward, but Scopus includes some older records. The search in Scopus resulted in 107 hits.

Table 3: Search strategy in Scopus.

20141030

((TITLE-ABS-KEY (acacia OR acacias OR mimosa OR mimosas OR phyllodoce) AND TITLE-ABS-KEY (dealbata OR floribunda OR latifolia OR longifolia OR macrostachya OR melanoxyl* OR retinodes OR saligna)) OR (TITLE-ABS-KEY ("acacia cyanophyll*" OR "coast wattle*" OR "golden wattle*" OR "long leaved wattle*" OR "racosperma floribundum" OR "racosperma longifolium" OR "silver wattle*" OR trichilogaster)) OR (TITLE-ABS-KEY (alien of exotic* OR introduced OR invasi* OR invad* OR "non indigenous" OR nonindigenous OR "non native*" OR nonnative*) AND TITLE-ABS-KEY (acacia OR acacias OR mimosa OR



mimosas))) AND TITLE-ABS-KEY (("Irish Republic" OR (ireland AND NOT ("northern ireland" OR "elsevier ireland")) OR austria OR belgium OR bulgaria OR cyprus OR "czech republic" OR czechoslovakia OR denmark OR estonia OR finland OR france OR germany OR "german democratic republic" OR "german federal republic" OR greece OR hungary OR italy OR latvia OR lithuania OR luxembourg OR malta OR netherlands OR poland OR portugal OR romania OR slovakia OR slovenia OR spain OR sweden OR uk OR "united kingdom" OR "great britain" OR england OR scotland OR wales OR "northern ireland" OR croatia))

Zoological Record

The search strategy for Zoological Record was based on the search strategy for CAB Abstracts. Boolean operators used are AND, OR. Truncation (*) was used to retrieve all possible suffix variations of the root word indicated. The wild card character? was used to substitute for one or no characters. The search in Zoological Record was done from 1978 onward and resulted in 16 hits.

Table 4: Search strategy in Zoological Record.

20141029

- 1 ((acacia or acacias or mimosa or mimosa or phyllodoce) and (dealbata or floribunda or latifolia or longifolia or macrostachya or melanoxyl?? or retinodes or saligna)) or acacia cyanophyll* or coast wattle? or golden wattle? or long leaved wattle? or racosperma floribundum or racosperma longifolium or silver wattle?
- 2 ((alien of exotic? or introduced or invasi* or non indigenous or nonindigenous or non native* or nonnative*) and (acacia or acacias or mimosa or mimosas))
- 3 1 or 2
- 4 trichilogaster
- 5 3 or 4
- 6 austria or belgium or bulgaria or croatia or cyprus or czech republic or czechoslovakia or denmark or estonia or european union or finland or france or germany or greece or hungary or irish republic or "republic of ireland" or italy or latvia or lithuania or luxembourg or malta or netherlands or poland or portugal or romania or slovakia or slovenia or spain or sweden or united kingdom or britain or exp france or exp germany or exp greece or exp italy or exp spain or exp united kingdom
- 7 5 and 6

2.2Grey/technical literature from website searches and via organisations

Extensive literature searches were done on many websites and in many databases, including invasive species databases and websites from regional/national authorities, plant protection organizations, national floras, The Dutch Flower Auctions Association VBN, nurseries, organizations in relation to ornamentals, and national libraries. At the start of the project a list was made with potential interesting sources. This list was further expanded during the course of the project. The list partly resulted from personal knowledge from the information professionals and experts involved in this project, partly from consulting experts/colleague researchers in other EU Member States and partly from searches on the Web. In addition, searches were also done via Google and Google Scholar. An overview of organisations/websites with relevant information is given in Table 5. In appendix B an overview is given of consulted websites that did not yield any relevant information. Papers were also identified by stydying lists of references of selected papers.



Table 5: Organisations and websites with relevant information on *Acacia* spp.

| Country | Organisation | URL |
|----------|--|--|
| Belgium | Pépinière Hulsdonk | http://www.hulsdonk.com/ |
| Croatia | Flora Croatica Database | http://hirc.botanic.hr/fcd/Search.aspx |
| Cyprus | Cyprus Environment & Energy | http://www.cypenv.info/cypnat/files/t |
| | | rees.aspx |
| | Ministry of Agriculture, Natural | http://www.moa.gov.cy/moa/agricult |
| | Resources and Environment | ure.nsf/index en/index en?OpenDoc |
| | | ument |
| | Natura Cypria | http://www.cypenv.info/cypnat/files/t |
| | | rees.aspx |
| Denmark | GBIF Free and open access to biodiversity | http://www.gbif.org/species/2978730 |
| | data | |
| European | Acacia World | http://www.acacia-world.net |
| Union | DAISIE | http://www.europe-aliens.org |
| | EPPO PQR Database | http://www.eppo.int/DATABASES/p |
| | | gr/pgr.htm |
| | European Network on Invasive Alien | http://www.nobanis.org/About.asp |
| | Species (NOBANIS) | |
| | GBIF Resources | http://rs.gbif.org |
| | Global invasive species database ISSG | http://www.issg.org/database/welcom |
| | or the control of | e/ |
| | Global invasive species information | http://www.gisin.org |
| | network | metps///www.igishireig |
| | GRIN Database | http://www.ars-grin.gov/cgi- |
| | Grant & Million Mark | bin/npgs/html/tax_search.pl |
| | International Legume Databases & | http://www.ildis.org/ |
| | information service (ILDIS) | international state of the stat |
| | Invasive Species Compendium | http://www.cabi.org/isc |
| | Q-bank – comprehensive databases on | http://www.q- |
| | quarantine plant pests and diseases | bank.eu/Plants/BioloMICS.aspx?Tab |
| | quarantine plant pests and diseases | le=Plants |
| | The Plantlist | http://www.theplantlist.org/ |
| | World Wide Wattle | http://www.worldwidewattle.com |
| France | AGROCAMPUS OUEST Centre | http://www.agrodoc-ouest.org/ |
| Trunce | d'Angers | ittp://www.agrodoc odest.org/ |
| | Florama | http://www.florama.fr/ |
| | Inventaire National du Patrimoine Naturel | http://inpn.mnhn.fr/espece/cd_nom |
| | Irstea Publications et Bases documentaires | http://cemadoc.cemagref.fr/exl- |
| | instea i doneations et Bases documentaires | php/cadcgp.php?query=1&MODELE |
| | | =vues/p_recherche_publication/home |
| | | .htmlphp/cadcgp.php?NOM=cadic |
| | | anonyme&PASSE=&FROM_LOGI |
| | | N=1&CMD=CHERCHE&query |
| | | =1&MODELE=portail%2Fportailv2. |
| | | html&TABLE=PUB_DOC&SOURC |
| | | E=SearchServer_3.0&NOMFONDS |
| | | =Exlibris+WEB&SELF=&URL RE |
| | | QUETE= |
| | Jardiland | http://www.jardiland.com/ |
| | Jardinage | http://jardinage.comprendrechoisir.co |
| | Jardinage | m/ |
| | | 111/ |



| | Les Botaniques du Val Douve | http://www.les-botaniques-du-val- |
|----------|---|---|
| | | douve.com/ |
| | Mandelieu La Napoule | http://www.mandelieu.com/ |
| | Pépinières Cavatore | http://www.mimosa-cavatore.com/ |
| | Pépinières Eric Duval | http://www.pepinieres-duval.com/ |
| | Pépinière Ezavin | http://www.pepinieres- |
| | | ezavin.com/mdf_def/catfleurs.htm |
| | Pépinières Issa des Hauts de Valcyre | http://pepiniereissa.fr/ |
| | Pépinières de Kerzarc'h | http://www.pepinieresdekerzarch.fr/ |
| | Pépinière La Palmeraie | http://www.pepiniere-palmeraie.com/ |
| | Pépinière de Saint Jean | http://www.pepinieredesaintjean.com/ |
| | Pépinières Saint Georges | http://www.pepiniere-stgeorges.fr/ |
| | Plantes-et-jardins | http://mag.plantes-et-jardins.com/ |
| | ProdINRA | http://prodinra.inra.fr/?locale=en |
| | Tela Botanica | http://www.tela-botanica.org |
| Germany | PPP-Index Pflanzeneinkaufsführer | http://www.ppp-index.de/ |
| Greece | Agios Gioannis | http://www.fytopromitheytiki.gr/ |
| | Delta Trees Blogspot | http://delta-trees.blogspot.nl/ |
| | Ergotech | http://www.ergotech.gr/fyta.pdf |
| | Geoponiko Parko | http://www.geoponiko-parko.gr/ |
| | Papanikolaounurseries | http://www.papanikolaounurseries.gr |
| | | /?page_id=230 |
| Italy | Acta Plantarum | http://www.actaplantarum.org/flora/fl |
| | | ora_info.php?id=216 |
| | Albanesi : la voce degli italiani moderni | http://www.albanesi.it/ambiente/giar |
| | | dino/acacia-mimosa.htm |
| | Altervista Flora Italiana | www.luirig.altervista.org |
| | Fattoria Beretta | http://www.fattoriaberetta.it/acacia.ht |
| | | <u>m</u> |
| | Fitodifesa | http://www.fitodifesa.it/ornamentali/90-mimosa.html |
| | Florsilva | http://www.florsilva.it/it/catalogo- |
| | 110151114 | prodotti/item/344html |
| | Margheriti Piante | http://www.margheriti.it/images/mar |
| | Transferra France | gheriti.pdf |
| | Piante & Vivai | http://www.piantevivai.com/ |
| | Riviera24 | http://www.riviera24.it/articoli/2008/ |
| | KIVIOIU2+ | 03/5/37562/festa-della-donna-95- |
| | | mimosa-in-italia-proviene-dalla- |
| | | riviera-dei-fiori |
| | University of Bologna | http://www.eng.unibo.it/PortaleEn/de |
| | Oniversity of Bologna | fault.htm |
| | Vivai MGF | http://www.vivaiopistoia.it/ |
| | Vivai Nannini | http://www.vivainannini.com/ |
| | Vivaio Noaro | http://www.noarovivaio.it/main.php? |
| | VIVAIO INDAIO | i=pianta-del-mese |
| | Vivaio Piante la Fronda | http://www.vivaiolafronda.com/ |
| | Vivai Torsanlorenzo | |
| | Vivai Torre Vivai Torre | http://www.vivaitorsanlorenzo.it/ |
| Molta | | http://www.vivaitorrenatale.com/ |
| Malta | Malta Environment & Planning Authority | http://www.mepa.org.mt/guidelines- |
| <u> </u> | (MEPA) | alienplants |



| The | NVWA | https://www.vwa.nl/ |
|-------------|--|---|
| Netherlands | PlantScope | www.plantscope.nl |
| | Wageningen UR | http://www.internationalplantnames.c |
| | | <u>om/</u> |
| Portugal | DinamisGlobe | http://www.dinamisglobe.org/pt/ |
| | Biblioteca do Conhencimento | http://www.b- |
| | online(Escola Superior Agrária | on.pt/index.php?lang=en |
| | Biblioteca) | |
| | Invasoras | http://invasoras.pt |
| Spain | Alberola Viveros | http://tienda.alberolaviveros.com/ |
| | Arboles Ornamentales | http://www.arbolesornamentales.es/ |
| | Bibliotheca del Instituto Nacional de | http://iniabib.inia.es/absys/abwebp.ex |
| | Investigación y Tecnología Agraria y | <u>e/</u> |
| | Alimentaria (INIA) | |
| | Guíaverde cosagro | http://www.guiaverde.com/plant_gui |
| | | de/acacia_dealbata_31 |
| | Ministerio de Agricultura, Alimentación, | http://www.magrama.gob.es |
| | y Medio Ambiente | |
| | Universidad de Almeria, Departamento de | http://cms.ual.es/UAL/universidad/de |
| | Producción Vegetal | partamentos/produccionvegetal/index |
| | | <u>.htm</u> |
| | Universidad de Almería | http://www.ual.es/personal/edana/alie |
| | | nplants/checklist.pdf |
| | University of Cordoba | http://helvia.uco.es/xmlui |
| | Universidad politecnica de Madrid | http://www.upm.es/institucional/UP |
| | | M/Biblioteca |
| | UPCT Departemento de Producción | http://www.bib.upct.es/ |
| | Vegetal de la Universidad Politécnica de | |
| | Cartagena | |
| | Valencia | http://www.valencia.es/ayuntamiento |
| | | /webs/estadistica/Anuario/2003%5C |
| | | Pdf%5C325.pdf |
| | | http://www.valencia.es/ayuntamiento |
| | | /webs/estadistica/Anuario/2006%5C |
| | Viscono Dio del Devile | Pdf%5C246.pdf |
| | Viveres del Poule | http://www.viverospladelpou.com/ |
| | Viveros del Sueve | http://www.delsueve.com/ |
| | Waste: Naturaleze ciencia medio | http://waste.ideal.es/invasoraslistapla |
| | ambiente | <u>ntas.htm</u> |

2.3 The selection process

The most important aspect in the selection criteria is whether or not a paper contributes to answering the study questions.

Reasons for inclusion of references include:

- Distribution and occurrence data in the wild of A. longifolia and A. in EU member states,
- Information on occurrence of *A. longifolia* and *A. floribunda* in landscape plantings and urban use,
- Data on areas of cultivation of *A. longifolia* and *A. floribunda* in EU member states, both for landscape/urban use and for cut flowers/cut foliage/pot plant.
- Information on ornamental use of A. longifolia and A. floribunda in EU countries,



- Information on varieties and hybrids of A. longifolia and A. floribunda in EU countries,
- Information on pests and diseases in *A.longifolia* and *A. floribunda* and on the pest management in EU countries,
- Information on the source of the ornamental product (field collected, nursery grown),
- Information on plant propagation of A. longifolia and A. floribunda in EU member states,
- Extent of cultivation and invasive presence of other *Acacia* species like *A. dealbata*, *A. melanoxylon*, *A. retinodes en A. saligna*.
- Information on ornamental use of A. retinodes and A. dealbata in EU countries,
- Information on varieties and hybrids of A. retinodes and A. dealbata in EU countries,
- Information on potential use of *Acacia* wood, e.g. the potential for paper making.

Confusion in taxonomy in relation to *A. floribunda* and *A. retinodes* was taken into account. Any information on potential sources of these confusions in taxonomy were delivered to EFSA.

Reasons for exclusion of references:

- Occurrence or cultivation in non-EU country, e.g. Australia, South Africa,
- Information on biological control of *A. longifolia* in South Africa by the introduction of *Trichilogaster acaciaelongifoliae*,
- False acacia (*Robinia pseudoacacia*),
- Vegetation studies unless they give information on the occurrence,
- Effects of *Acacia* spp. on soil characteristics, soil micro-organisms etc., unless they give information on the occurrence,
- Allellopathy/phytotoxicity studies, understorey studies,
- Seed bank studies;
- Studies on management/control of invaders, unless they give information on the occurrence,
- Effect of climate change on invaders,
- Performance of *Acacia* spp. on heavy metals contaminated soils
- Studies on pollen morphology, physiological studies,
- Model studies.

2.4 Storage of records

Most records were stored in an EndNote library and provided to EFSA. All references are listed in chapter 5. In addition to the fields that a database provides, e.g. on author, year, title, journal, keywords etc., information on date of search, species and country was included in different custom fields, as explained in Table 6. Inclusion of date of search and search strategy means that the search is completely transparent and can be reproduced exactly. In addition to the date, the custom 1 field contains "y" (yes). This means that a record was selected during the selection process. References that were not selected during the selection process contained "n" (not). These references were not included in the EndNote library provided to EFSA.

In the EndNote library groups were made of individual species and individual countries. Although all search results for a specific species or EU Member State can easily be found by using the search command, this group usage allows EFSA to quickly have a list of records of individual species and individual countries by clicking on the group in question. Moreover, it immediately gives insight in the number of records in all groups (species and countries).

Table 6: Definition of additional fields in the EndNote library

| Field | Content |
|----------|-------------------------------|
| Custom 1 | Date of search, e.g. 20141030 |



| Custom 3 | Species |
|----------|---------|
| Custom 4 | Country |

3. RESULTS

3.1 Acacia spp.

The genus *Acacia* contains over 1300 species, about 960 of them are native to Australia, with the remainder spread around the tropical to warm-temperate regions of both hemispheres (Maslin, 2001). Australian Acacias have been widely planted outside their natural ranges, and landscapes in many parts of the world are now dominated by planted or self-sown stands of Australian Acacias (Richardson *et al.*, 2011). Some Australian Acacias are among the most widespread and damaging of all invasive plants (Richardson and Rejmánek, 2011), whereas others are commercially important crops (Kull *et al.*, 2011). Some species are both invasive and commercially important, like *A. dealbata*.

In the eighteenth and nineteenth century several Acacia species were introduced into Europe and now about 30 species are cultivated or naturalized in Europe, especially in the Mediterranean area, including mainland and islands of Portugal, Spain, France and Italy. At least eight Australian Acacias have become potential pests in this area: A. dealbata, A.melanoxylon, A. longifolia, A. retinodes, A. saligna, A. mearnsii, A. pycnantha and A. karroo (Lorenzo et al., 2010). These species threaten native habitats by competing with indigenous vegetation, thereby reducing biodiversity.

The spread of Acacia species beyond gardens and plantations is due to the dispersal capabilities of these species (Breton *et al.*, 2008). The invasive success of Acacia species can be attributed to factors like their rapid growth, the ability to out-compete native plants, their capacity to accumulate high biomass, their capacity to fix nitrogen and their capacity to form large persistent seed banks (Le Maitre *et al.*, 2011). Fires and deep frosts facilitate the colonization of Acacia species. They destroy trees but stimulate germination of the seeds, which are characterized by hardseededness. Acacia species have been shown to induce simultaneous changes in the above- and below-ground communities, microclimates, soil moisture regimes and soil nutrient levels (Marchante *et al.*, 2003, 2008a,b, 2011, Le Maitre *et al.*, 2011).

At present, A. dealbata, A. melanoxylon and A. longifolia are the most prolific invaders in France, Italy, Portugal and Spain, especially in conservation areas. A. longifolia is the most prominent and widespread invader in Portuguese dunes (Lorenzo et al., 2010, Marchante, 2011). It was introduced to curb sand erosion in dune systems. It was also introduced as an ornamental. A. melanoxylon is also used as an ornamental and for timber production in Portugal (Breton et al., 2008, Ratnayake and Joyce, 2010). The most invasive Acacia in Italy is A. saligna (Celesti et al., 2010). This species has been introduced in coastal areas for reforestation purposes and for dune stabilization. It is also utilized for animal fodder, tannin production, windbreaks, ornamental use and as a source of fuel wood. However, its spread has not been controlled, and it currently occurs in many Italian regions. In particular, this species is widespread on the Southern Adriatic coast, and it grows between the Mediterranean scrub and the evergreen forest of the fixed dunes in central and southern Italy (Izzi et al., 2007). The most widespread Acacia species is probably A. dealbata (Sheppard et al., 2006, Lorenzo et al., 2010).

Acacia dealbata has become important to both the cut flower industry and the use in the manufacture of high grade perfume. Gardeners have created several new cultivars of A. dealbata. Another important cut flower is A. retinodes, although its importance is decreasing due to pests. A. baileyana 'Purpurea' is grown in Italy for its attractive cut foliage. In Europe Acacia is often traded as Mimosa.

3.2 Taxonomy of Acacia longifolia and Acacia floribunda.

The two host species for *Trichilogaster acaciaefoliae*, *A. longifolia* and *A. floribunda* have many common names and synonyms. The sources for retrieving these names are listed in Table 7. The



common names and synonyms of *A. floribunda* are listed in Table 8 and those for *A. longifolia* in Table 9.

Table 7: Sources used to retrieve information on taxonomy of *Acacia floribunda* and *Acacia longifolia*.

| Source | URL |
|------------------------------------|---|
| Acta Plantarum (Italy) | http://www.actaplantarum.org/ |
| DAISIE | http://www.europe-aliens.org/ |
| GBIF Resources | http://rs.gbif.org |
| Global Invasive Species Database | http://www.issg.org/database/welcome/ |
| GRIN Database | http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl |
| Leguminosae | |
| In: Flora Europaea Vol. 2. | |
| Heywood, V.H. & Ball, P.W. (1968). | |
| ed. Tutin, T.G. et al. | |
| List of Names of Woody plants. | http://www.internationalplantnames.com/ |
| Hoffman, M.H.A. (2010). | |
| ILDIS Legume Database | http://www.ildis.org/ |
| Invasive Species Compendium | http://www.cabi.org/isc |
| Invasoras (Portugal) | http://invasoras.pt/ |
| Plantfinder RHS | https://www.rhs.org.uk/plants/search-form |
| PlantScope | www.plantscope.nl |
| PPP-index | http://www.ppp-index.de/pppindex.dll |
| The Plantlist | http://www.theplantlist.org/ |

Table 8: Common names and synonyms of Acacia floribunda (Vent.) Willd.

| Common name/ synonym | Name | Origin | |
|-------------------------|--|--|--|
| Common names | catkin wattle | English/Australian | |
| | gossamer wattle | English/Australian | |
| | river wattle | English/Australian | |
| | sally wattle | English/Australian | |
| | white sallow | English/Australian | |
| | white sallow wattle | English/Australian | |
| | white sally | English/Australian | |
| | blomsterakacia | Swedish | |
| | grossamer Wattle | | |
| | weeping Acacia | | |
| Synonyms | Acacia angustifolia Lodd. | | |
| | Acacia intermedia <u>Hook.</u> | | |
| | Acacia longifolia (Andrews) Willd. var. | floribunda Vent.)Benth. | |
| | Acacia longifolia (Andrews) Willd. var. | <i>floribunda</i> (Vent.) <u>F.Muell.</u> | |
| | Acacia retinodes Schltdl. var. floribunda (Vent.)H.Vilm. | | |
| | Mimosa floribunda Vent. | | |
| | Phyllodoce floribunda (Vent.) Link | | |
| | Racosperma floribundum (Vent.) Pedley | <u>, </u> | |





Table 9: Common names and synonyms of Acacia longifolia (Andrews) Willd.

| Common name/ synonym | Name | Origin |
|-------------------------|---|------------|
| Common names | Coastal wattle | English |
| | Coast Wattle | English |
| | Golden-rods | English |
| | Golden Wattle | English |
| | Longleaf wattle | English |
| | Long-leaved wattle | English |
| | Sallow wattle | English |
| | Sydney golden wattle | English |
| | Sydney acacia | English |
| | Langblaarwattel | African |
| | Långbladsakacia | Swedish |
| | Acacia Trinervis | |
| | Acacia à longues feuilles | French |
| | Mimosa chenille | French |
| | Kätzchenakazie | German |
| | Langblättrige Akazie | German |
| | Gaggia a foglie lunghe | Italian |
| | Mimosa a foglie lunghe | Italian |
| | Acácia-de-espigas | Portuguese |
| | Acacia blanca | Spanish |
| | Aroma Doble | Spanish |
| | Mimosa dorada | Spanish |
| | Mimosa dorada | Spanish |
| | Акация длиннолистная | Russian |
| Synonyms | Mimosa longifolia Andrews | |
| | Mimosa macrostachya Poir. | |
| | Phyllodoce longifolia (Andrews) Link | |
| | Racosperma longifolium (Andrews) C. Mart. | |

Acacia floribunda versus Acacia retinodes

There is some confusion about the names A. floribunda and A. retinodes. The name A. floribunda is often used in Europe for ornamental Acacias. However, these plants are not true to name; the valid name of these plants is A. retinodes Schltdl. In literature the misapplied name is indicated as Acacia floribunda sensu auct. These plants definitely have no relation to the valid species A. floribunda (Vent.) Willd.

In fact both species, *A. floribunda* (Vent.) Willd. and *A. retinoides* Schltdl. are well-defined, clearly distinguishable and not much related to each other. In taxonomical publications and databases (e.g. Flora Europaea, European Garden Flora, ILDIS, The Plant List, etc.) there is no confusion anymore, but in the ornamental industry (especially among growers in Liguria, Italy) the name *A. floribunda* is still used for plants of *A. retinoides* Schltdl. The latter species is introduced (and naturalised) in Southern Europe, but is not considered by the Australians as a species within the host range of *Trichilogaster*.

Main differences between the two species: *A. retinodes* has flowers in capitulae and *A. floribunda* has flowers in spikes, like *A. longifolia*.





Acacia retinodes Acacia floribunda
http://www.anbg.gov.au/acacia/species/A-retinodes.html
http://bloomandblossom.blogspot.nl/2010/09/bloom-day-acacia-floribunda.html

sources: The plantlist, ILDIS, Flora Europaea, Acta Plantarum, personal information of Hélia Marchante (Centre for Studies of Natural Resources, Environment and Society, Department of Environment, Coimbra, Portugal) and Mauro Mariotti (director of the Hanbury Botanical Gardens in Ventimiglia, Italy).

3.3 Distribution in the wild

The USDA hardiness zones have been identified for *A. floribunda* and *A. longifolia*. Both species are reported to grow in USDA zone 10-11 (sometimes 9b)(Figure 1). Potentially, they can only grow in the subtropics. This served as a basis for the identification of the occurrence in the wild of both species in each EU member state.

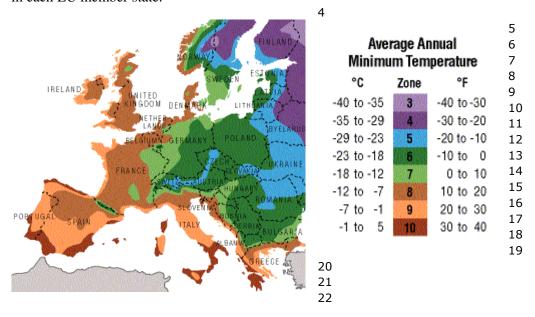


Figure 1: USDA Hardiness zones.

To get insight in the distribution of *A. floribunda* and *A. longifolia* in Europe, several databases were searched. These databases are listed in Table 10. Relevant datasheets retrieved from these databases are listed in Table 11. Some databases only give insight in the presence in specific countries and/or islands. Other databases also give insight in the stage of invasion, i.e. casual, naturalized. An overview of concepts and definitions in plant invasion biology is given in Table 12.



In addition distribution was also determined for *A.dealbata*, *A. melanoxylon*, *A. retinodes* and *A. saligna*. Distribution data were also obtained by studying references resulting from the extensive and systematic literature search. Results are presented in this paragraph and in the Excel-file that has been delivered to EFSA. With a few exceptions hardly any detailed data are available on areas of occurrence in the wild. Kull *et al.* (2011) report the occurrence of 2850 ha of *A. longifolia* between Pedrogão and S. Jacinto (= 12% of the 24,000 ha coastal strip). The species occurs in dense stands in the dunes and interspersed as undergrowth in *Pinus pinaster* plantations. In some studies areas are given in a (national) park, e.g. Giuliani *et al.*, (2014) report the presence of 18 ha *A. dealbata* on Calamita Mountain on the Island of Elba. The area is rapidly increasing, as well as the area of *A. pycnantha*. Coimbra (1999) reports the presence of 160 ha (0,5% of the total forested area) *A. dealbata* in unmixed stands in Serra de Estrela Natural Park. The species occurs presently only under the altitude of 1000 metres (800 metres in unmixed populations), but is more common between 400 and 600 metres.

Table 10: Invasive species databases and the Legume Web used to retrieve information on distribution of the different *Acacia* species.

| Source | URL |
|-------------------------------------|--|
| Acta Plantarum (Italy) | http://www.actaplantarum.org |
| Altervista Flora Italiana (Italy) | www.luirig.altervista.org |
| DAISIE | http://www.europe-aliens.org |
| DinamisGlobe (Portugal, Spain) | http://www.dinamisglobe.org/pt/ |
| EPPO PQR Database | http://www.eppo.int/DATABASES/pqr/pqr.htm |
| Global invasive species information | http://www.gisin.org |
| network | |
| Global Invasive Species Database | http://www.issg.org/database/welcome/ |
| ILDIS Legume Database | http://www.ildis.org/ |
| Invasive Species Compendium | http://www.cabi.org/isc |
| Invasoras (Portugal) | http://invasoras.pt |
| Inventaire National du Patrimoine | http://inpn.mnhn.fr/espece/cd_nom |
| Naturel (France) | |
| Magrama (Spain) | http://www.magrama.gob.es/es/biodiversidad/temas/inventa |
| | rios-nacionales/inventario-especies-terrestres/inventario- |
| | nacional-de- |
| | biodiversidad/ieet_flora_vasc_aloct_invas_cientifico_a.asp |
| | <u>X</u> |
| Nobanis database | http://www.nobanis.org/default.asp |
| Tela Botanica (France) | http://www.tela-botanica.org |

Table 11: Invasive species databases and relevant datasheets retrieved from these databases.

| Database | Species | URL |
|----------|--------------------|--|
| DAISIE | Acacia dealbata | http://www.europe- |
| | | aliens.org/pdf/Acacia_dealbata.pdf |
| | Acacia longifolia | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | <u>2773#</u> |
| | Acacia melanoxylon | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | <u>2793#</u> |
| | Acacia retinodes | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | <u>2810#</u> |



| | Acacia saligna | http://www.europe- |
|--------------|--------------------|--|
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | <u>2823#</u> |
| Invasive | Acacia dealbata | http://www.cabi.org/isc/datasheet/2207 |
| Species | Acacia longifolia | http://www.cabi.org/isc/datasheet/2312 |
| Compendium | Acacia melanoxylon | http://www.cabi.org/isc/datasheet/2329 |
| | Acacia saligna | http://www.cabi.org/isc/datasheet/2402 |
| Invasoras | Acacia dealbata | http://invasoras.pt/wp- |
| | | content/uploads/2012/10/Acacia- |
| | | <u>dealbata en.pdf</u> |
| | Acacia longifolia | http://invasoras.pt/wp- |
| | | content/uploads/2012/10/Acacia- |
| | | <u>longifolia_en.pdf</u> |
| | Acacia melanoxylon | http://invasoras.pt/en/gallery/acacia- |
| | · | melanoxylon-en/ |
| | Acacia retinodes | http://invasoras.pt/en/gallery/acacia- |
| | | retinodes-en/ |
| | Acacia saligna | http://invasoras.pt/wp- |
| | G | content/uploads/2012/10/Acacia- |
| | | saligna_en.pdf |
| DinamisGlobe | Acacia dealbata | http://www.dinamisglobe.org/pt/plantas- |
| | | invasoras?hashid=9f61408e3afb633e50cdf |
| | | b20de6f466&doAction=show |
| | Acacia longifolia | http://www.dinamisglobe.org/pt/plantas- |
| | 0.7 | invasoras?hashid=735b90b4568125ed6c3f |
| | | 78819b6e058&doAction=show |
| | Acacia melanoxylon | http://www.dinamisglobe.org/pt/plantas- |
| | • | invasoras?hashid=7cbbc409ec990f19c78c7 |
| | | 5bd1e06f215&doAction=show |
| | Acacia retinodes | http://www.dinamisglobe.org/pt/plantas- |
| | | invasoras?hashid=d2ddea18f00665ce8623 |
| | | 36bd4e3c7c5&doAction=show |
| | Acacia saligna | http://www.dinamisglobe.org/pt/plantas- |
| | C | invasoras?hashid=ea5d2f1c4608232e07d3 |
| | | a3d998e5135&doAction=show |
| Magrama | Acacia dealbata | http://www.magrama.gob.es/es/biodiversid |
| | | d/temas/inventarios- |
| | | nacionales/acacia_dealbata_tcm7- |
| | | 21485.pdf |
| | Acacia longifolia | http://www.magrama.gob.es/es/biodiversic |
| | | d/temas/inventarios- |
| | | nacionales/acacia_longifolia_tcm7- |
| | | 21486.pdf |
| | Acacia melanoxylon | http://www.magrama.gob.es/es/biodiversid |
| | • | d/temas/inventarios- |
| | | nacionales/acacia_melanoxylon_tcm7- |
| | | 21487.pdf |
| | Acacia saligna | http://www.magrama.gob.es/es/biodiversion |
| | <u>.</u> | d/temas/inventarios- |
| | | |



| Tela Botanica | Acacia dealbata | http://www.tela-botanica.org/bdtfx-nn-96- |
|---------------|--------------------|--|
| | | <u>synthese</u> |
| | Acacia longifolia | http://www.tela-botanica.org/bdtfx-nn-103- |
| | | synthese |
| | Acacia melanoxylon | http://www.tela-botanica.org/bdtfx-nn-106- |
| | | <u>synthese</u> |
| | Acacia retinodes | http://www.tela-botanica.org/bdtfx-nn-110- |
| | | synthese |
| | Acacia saligna | http://www.tela-botanica.org/bdtfx-nn-111- |
| | | <u>synthese</u> |
| Inventaire | Acacia dealbata | http://inpn.mnhn.fr/espece/cd_nom/79691 |
| National du | Acacia longifolia | http://inpn.mnhn.fr/espece/cd_nom/79698 |
| Patrimoine | Acacia melanoxylon | http://inpn.mnhn.fr/espece/cd_nom/79701 |
| Naturel | Acacia retinodes | http://inpn.mnhn.fr/espece/cd_nom/79707 |
| | Acacia saligna | http://inpn.mnhn.fr/espece/cd_nom/79710 |

Table 12: Concepts and definitions used in plant invasion biology (Richardson *et al.*, 2000; Marchante, 2011).

| Concept | Definition |
|---|--|
| Exotic, alien, aloctonous, non-native, non- | Plant taxa whose presence in a given area is due |
| Indigenous | to introduction, intentional or accidental, as a |
| | result of human activity. |
| Casual, occasional, escape, transient | Subset of alien plants that may flourish, and even |
| | reproduce occasionally in an area, but which do |
| | not form self-replacing populations, and which |
| | rely on repeated introductions to persist. |
| Naturalized, sub-spontaneous | Subset of alien plant that reproduce consistently |
| | and sustain populations over many life cycles |
| | without direct intervention by humans (or in spite |
| | of human intervention); often recruit offspring |
| | freely, usually close to adult plants, and do |
| | not necessarily spread into natural, semi-natural |
| | or human-made ecosystems. |
| Invasive, environmental weed | Subset of naturalized plants that produce |
| | reproductive offspring, often in very large |
| | numbers, at considerable distances from parent |
| | plants. |



Acacia floribunda (Vent.) Willd.



Natural distribution

Southeastern Australia (New South Wales, Queensland and Victoria).

Naturalised in

Asia: Indonesia-ISO, Java, Malaysia, Peninsular Malaysia, Sri

Lanka, Sumatra Australasia: Australia Indian Ocean: Mauritius

Pacific Ocean: New Zealand (North)

(not naturalized in Europe!)

Castro-Diéz *et al.* (2011) stated that for some Acacia species their status as introduced species is not clear, either because of contradictory reports or because of lack of reports on their invasiveness. The latter is the case for *A. floribunda*.

A. floribunda (Vent.) Willd. is not mentioned in any botanical source. Distribution data within Europe are not available. When the name A. floribunda is mentioned, it is always the misapplied name, A. floribunda sensu auct., so in fact A. retinoides Schltdl. In the consulted botanical sources this is always clearly mentioned. It is therefore very likely that A. floribunda (Vent.) Willd. is not distributed as a non-native plant in Europe.



Acacia longifolia (Andrews) Willd.



(Source: http://invasoras.pt)

Natural distribution

Natural distribution in East and Southeast Australia (New South Wales, Queensland, South Australia, Tasmania & Victoria)

Naturalized in many tropical and subtropical places worldwide:

Africa: Kenya, South Africa

Asia: India, Indonesia-ISO, Java, Myanmar, Sri

Lanka

Caribbean: Dominican Republic Europe: Italy, Portugal, Spain, France India: Meghalaya, Pondicherry, Tamil Nadu

Indian Ocean: Mauritius, Reunion North America: United States

Pacific Ocean: New Zealand (North), New

Zealand (South)

South America: Argentina, Brazil, Colombia,

Uruguay

United States: California

The worldwide distribution of *A. longifolia* is shown in Figure 2 and the distribution in Europe in Figure 3 and 4.



Figure 2. Worldwide distribution of *A. longifolia*. (Source: Georeferenced data GBIF worldwide http://www.gbif.org/species/2978730).





Figure 3. Distribution of *A. longifolia* in Europe. (Source: Georeferenced data GBIF Europe http://www.gbif.org/species/2978730).



Figure 4. Distribution of *A. longifolia* in Europe. (Source: (Source: www.luirig.altervista.org)

Distribution maps of *A. longifolia* for Italy, Portugal, Spain and France are shown in Figure 5. The presence of *A. longifolia* in different provinces/departments/regions is given in Table 12.

Table 12: The presence of *A. longifolia* in different parts in Italy, Portugal, Spain and France.

| Country | Present in | Remarks |
|----------|--|---------------------------------|
| Italy | Liguria, Campania and Sardinia | |
| Portugal | Mainland Portugal (Trás-os-Montes, Minho, | |
| | Douro Litoral, Beira Litoral, Estremadura, | |
| | Ribatejo, Alto Alentejo, Baixo Alentejo, | |
| | Algarve), Azores archipelago (Santa Maria | |
| | island), Madeira archipelago (islands of Madeira | |
| | and Porto Santo) | |
| Spain | Ponteverda, Gerona (Blanes, Figueras), Alicante | It appears up to 100m altitude. |
| _ | (Guardamar del Segura), Galicia | |
| France | Corse, Gironde and Var | |



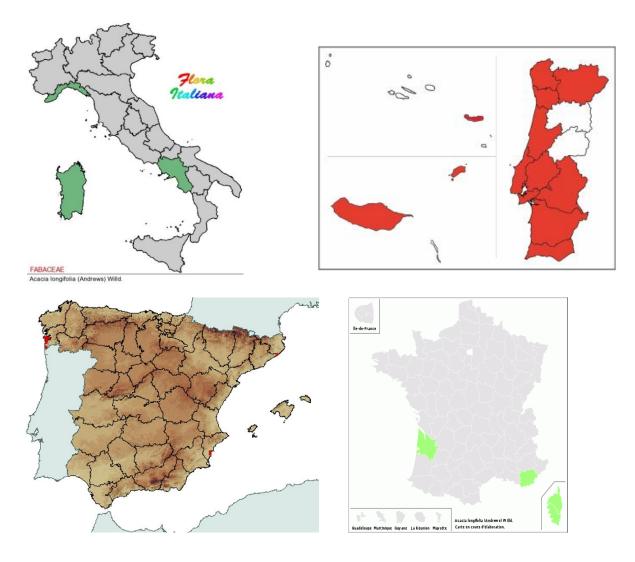


Figure 5. Distribution of *A. longifolia* in Italy, Portugal, Spain and France. (Sources: www.luirig.altervista.org, http://invasoras.pt/gallery/acacia-longifolia. (http://invasoras.pt/wp-content/uploads/2012/10/Acacia-longifolia_en.pdf), www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/acacia_longifolia_tcm7-21486.pdf),

http://www.telabotanica.org/page:eflore_bdtfx?type_nom=nom_scientifique&nom=Acacia+longifolia &referentiel=bdtfx&niveau=2&module=recherche&action=rechercheSimple&submit=OK).

Occurrence data of A. longifolia were not found for any other EU member state (see excel-file).



Acacia dealbata Link



(Source: http://invasoras.pt)

Synonymes: Acacia affinis Sweet; Acacia decurrens Willd. var. dealbata (Link)Muller; Acacia decurrens Willd.

var. dealbata (Link)Maiden; Acacia decurrens Willd. var. mollis Lindl.; Acacia derwentii Siebert & Voss; Acacia puberula Dehnh.; Racosperma dealbatum (Link) Pedley

Local names: Acacia Bernier; Acacia Francesa (Spanish: Chile; Akatziya Podbelyonnaya (Rus); Akatziya Serebristaya (Rus); Aroma; Aromo (Spanish: Chile); Aromo Del Pais (Spanish: Chile; Mimosa (En); Mimosa (En); Mimosa (En); Mimosa (En); Mimosa (En); Silver Wattle (En); Silver Wattle (En); Silver Wattle (En); Sydney Black Wattle; Wattle Bark

Natural distribution: S.E. Australia & Tasmania

Naturalized EU: France, Spain, Italy, Azores, former Yugoslavia, Portugal, Romania, Sardinia

(source: ILDIS & Flora Europaea) **USDA Hardiness zone:** 9a

Use: Ornamental, environmental, timber, soil-stabilisation, medicine, chemical Products

Distribution maps of *A. dealbata* for Italy, Portugal, Spain and France are shown in Figure 6. The presence of *A. dealbata* in different provinces/departments/regions is given in Table 13.

Table 13: The presence of *A. dealbata* in different parts in Italy, Portugal, Spain and France.

| Country | Present in | Remarks |
|----------|--|-----------------------------|
| Italy | Piemonte, Lombardia, Friuli-Venezia Giulia, | |
| | Liguria, Toscana, Lazio, Campania, Basilicata, | |
| | Sardinia | |
| Portugal | mainland Portugal (all provinces), Madeira | |
| | archipelago (Island of Madeira) | |
| Spain | La Coruña, Pontevedra, Orense, Lugo, Asturias, | It invades areas until 600m |
| | Vizcaya, Huesca, Lérida, Gerona, Barcelona, | altitude |
| | Valencia, Córdoba, Huelva, Cacéres, Salamanca | |
| France | Alpes maritimes, Ariege, Aveyron, Aude, | |
| | Charente Maritime, Charente, Dordogne, | |
| | Gironnes, Hautes Pyrenees, Herault, Landes, | |
| | Lotet Garonne, Lozerne, Pyrenees | |
| | Atlantiques, Tarnet Garonne, Var, Vienne | |

Acacia dealbata was also recorded in Croatia, Cyprus, Romania, Sweden and the non EU member state Switzerland (see excel-file). So far, the distribution in Switzerland is limiting, but the species has been placed on the watch list of invasive alien plants in 2014 (EPPO, 2014).



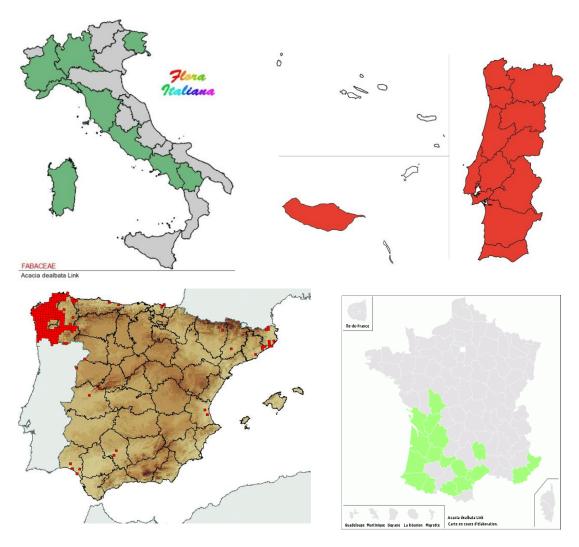


Figure 6. Distribution of A.dealbata in Italy, Portugal, Spain and France.

Sources: http://invasoras.pt/en/gallery/acacia-dealbata-en/

(http://invasoras.pt/wp-content/uploads/2012/10/Acacia-dealbata_en.pdf)

 $\underline{http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_dealbata_tcm7-lineario-nacionales/acacia_deal$

21485.pdf

http://www.tela-

 $\underline{botanica.org/page:eflore_bdtfx?type_nom=nom_scientifique\&nom=Acacia+dealbata\&referentiel=bdtf}\\x\&niveau=2\&module=recherche\&action=rechercheSimple\&submit=OK$



Acacia melanoxylon R. Br.



Synonymes: Acacia arcuata Spreng.; Mimosa melanoxylon (R. Br.) Poir.; Racosperma melanoxylon (R. Br.) C. Mart.; Racosperma melanoxylon (R. Br.) Pedley

Local names: Akatziya Chornodrevesnaya (Rus²; Aroma Salvaje; Australian Blackwood; Australian Blackwood; Australian Blackwood; Black Wattle; Blackwood (Au); Blackwood (Au); Blackwood (Au); Blackwood Acacia; Hickory (Au); Mudgerabah (Au); Sally Wattle (Au); Tasmanian Blackwood

(Source: http://invasoras.pt)

Natural distribution: S.E. Australia & Tasmania

Naturalized EU: Spain, France, Italy, United Kingdom, Azores, Moldova, Portugal (source: ILDIS &

Flora Europaea)

USDA Hardiness zone: 8b

Use: timber, environmental, fodder

N.B.: The name has sometimes been misapplied (as A. melanoxylon auct) to the wrong taxon: A.

cochlearis (Labill.) Wendl

Distribution maps of *A. melanoxylon* for Italy, Portugal, Spain and France are shown in Figure 7. The presence of *A. melanoxylon* in different provinces/departments/regions is given in Table 14.

Table 14: The presence of *A. melanoxylon* in different parts in Italy, Portugal, Spain and France.

| Country | Present in | Remarks |
|----------|--|---------|
| Italy | Liguria, Toscana, Lazio, Sicilia, Sardinia | |
| Portugal | mainland Portugal (all provinces), Azores archipelago (islands of São Miguel, Santa Maria, Terceira, Graciosa, S. Jorge, Pico, Faial and Flores), Madeira archipelago (islands of Madeira and Porto Santo) | |
| Spain | abundant in Galicia (La Coruña and Pontevedra), until 500m altitude. It is also present in the provinces Lugo, Asturias, Cantabria, Asturias, Orense and Barcelona | |
| France | Alpes maritimes and Var | |

Acacia melanoxylon was also recorded in Belgium and the UK.



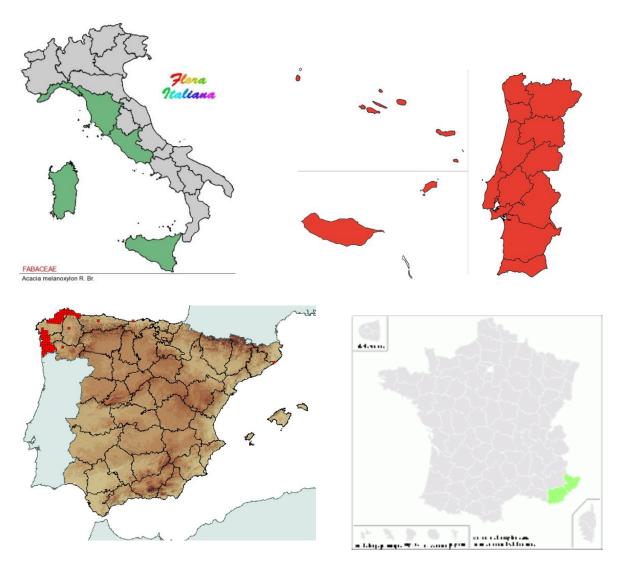


Figure 7. Distribution of *A.melanoxylon* in Italy, Portugal, Spain and France.

Sources: http://invasoras.pt/en/gallery/acacia-melanoxylon-en/
(http://invasoras.pt/wp-content/uploads/2012/10/Acacia-melanoxylon_en.pdf)
http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/acacia_melanoxylon_tcm7-21487.pdf
http://www.tela-botanica.org/bdtfx-nn-106-synthese



Acacia retinodes Schlecht.



Synonymes: Acacia floribunda sensu auct.;
Acacia fragrans Pottier; Acacia
longissima Chopinet; Acacia provincialis A.
Camus; Acacia semperflorens A. Berger
Local names: Akatziya Stoikaya (Rus);
Everblooming Acacia; Silver Wattle; Swamp
Wattle; Wirilda; Wirilda

(Source: http://invasoras.pt)

Natural distribution: S. Australia

Naturalized EU: Spain, Italy, Azores, Balearic Is, former Yugoslavia, France, Great Britain,

Portugal, Romania (source: ILDIS & Flora Europaea)

USDA Hardiness zone: 8b

Use: ornamental; environmental, cut flower

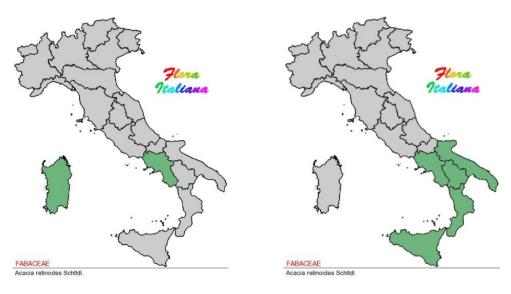
Distribution maps of *A. retinodes* for Italy, Portugal and France are shown in Figure 8. The presence of *A. retinodes* in different provinces/departments/regions is given in Table 15.

Table 15: The presence of *A. retinodes* in different parts in Italy, Portugal, Spain and France.

| Country | Present in | Remarks |
|----------|---|---|
| Italy | Campania, Sardinia | Acacia retinodes (synonyms: |
| | | Acacia provincialis A. Camus, |
| | | Acacia retinodes var. floribunda |
| | | H. Vilm., Acacia semperflorens |
| | | A. Berger |
| | Campania, Puglia, Basilicata, Calabria, Sicilia | Acacia retinodes (synonym Acacia floribunda Auct. |
| Portugal | Mainland Portugal ((Minho, Douro Litoral, Beira | |
| _ | Litoral, Estremadura, Alto Alentejo, Baixo | |
| | Alentejo, Algarve) | |
| Spain | | |
| France | Alpes maritimes, Aude, Corse and Var | |

Acacia retinodes was also reported in Croatia, Cyprus, Romania and the UK (see excel-file).





Synonyms:

- Acacia provincialis A. Camus
- Acacia retinodes var. floribunda H. Vilm.
- Acacia semperflorens A. Berger

Synonym:

- Acacia floribunda Auct.

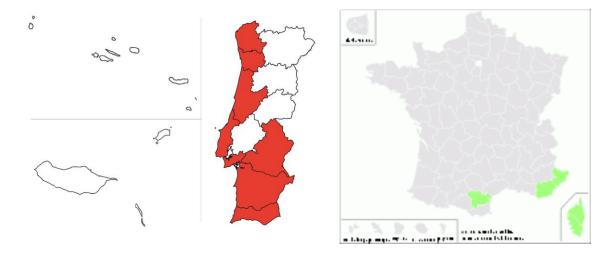


Figure 8. Distribution of *A.retinodes* in Italy, Portugal and France. Sources: http://invasoras.pt/en/gallery/acacia-retinodes-en/gallery/invasoras.pt/wp-content/uploads/2012/10/Acacia-retinodes_en.pdf). http://www.tela-botanica.org/bdtfx-nn-110-synthese



Acacia saligna (Labill.) H.L. Wendl.



Synonymes: Acacia bracteata Maiden & Blakeley; Acacia cyanophylla Lindl.; Acacia lindleyi Meissner; Mimosa saligna Labill.; Racosperma salignum (Labill.) Pedley

Local names: Blue-leafed Wattle (Au); Golden Wreath Wattle; Golden Wreath Wattle; Golden Wreath Wattle; Orange Wattle (Au); Port Jackson Willow; Western Australian Golden Watt

(Source: http://invasoras.pt)

Natural distribution: W. Australia

Naturalized EU: Spain, Cyprus, France, Italy, Greece, Corsica, Portugal, Sardinia, Sicily (source:

ILDIS & Flora Europaea) **USDA Hardiness zone:** 8b

Use: Environmental, wood, chemical products.

Distribution maps of *A. saligna* for Italy, Portugal, Spain and France are shown in Figure 9. The presence of *A. saligna* in different provinces/departments/regions is given in Table 16.

Table 16: The presence of *A. saligna* in different parts in Italy, Portugal, Spain and France.

| Country | Present in | Remarks |
|----------|--|---------|
| Italy | Liguria, Toscana, Molise, Campania, Puglia, | |
| | Basilicata, Calabria, Sicilia, Sardinia | |
| Portugal | Mainland Portugal (Beira Litoral, Estremadura, | |
| | Ribatejo, Alto Alentejo, Baixo Alentejo, | |
| | Algarve), Azores archipelago (island of São | |
| | Miguel), Madeira archipelago (island of Madeira) | |
| Spain | Malaga, Granada, Almeria, Alicante, Barcelona | |
| _ | and Gerona | |
| France | Alpes maritimes, Corse and Var | |

Acacia saligna was also reported in Croatia, Cyprus, Greece and Malta (see Excel-file). In Cyprus it is the most serious invasive species (Hadjikyriakou and Hadjisterkotis, 2002, Dufour-Dror, 2013). In Greece it is an alien of unknown naturalisation status (Arianoutsou *et al.*, 2010). In Malta it is one of the major plant invaders. Planting, propagation, sowing and sale of this species is illegal through the Trees and Woodlands Protection Regulations, 2001 (Brunel *et al.*, 2013).



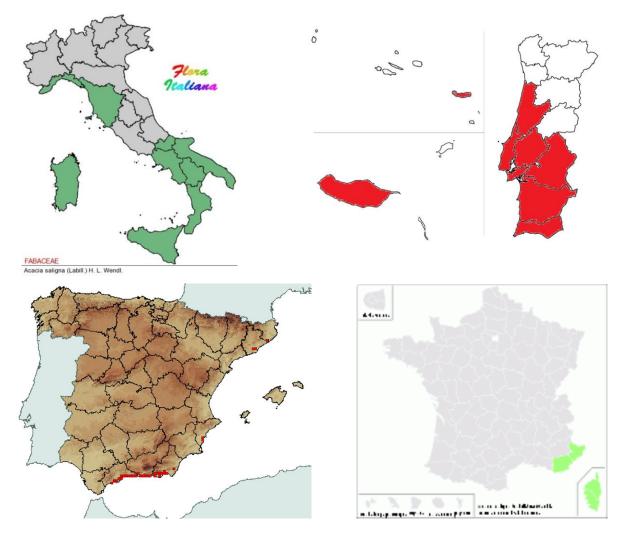


Figure 9. Distribution of *A.saligna* in Italy, Portugal, Spain and France. Sources: http://www.luirig.altervista.org, http://invasoras.pt/wp-content/uploads/2012/10/Acacia-saligna-en.pdfhttp://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/acacia-saligna-tcm7-21488.pdf, http://www.tela-botanica.org/bdtfx-nn-111-synthese

Distribution data of *A. dealbata, A. longifolia, A. melanoxylon, A. retinodes* and *A. saligna* were compared in different databases. The results of this survey are presented in Table 17. The databases searched were:

Acta Plantarum (A)
Altervista (V)
CABI (C)
DAISIE (D)
EPPO (E)
Global Invasive Species Database (G)
Invasoras (I)
Magrama (M)
Tela Botanica (T)

Acacia is are not included in the Nobanis database (http://www.nobanis.org/default.asp), which is a gateway to information on alien and invasive species in North and Central Europe (Austria, Belarus,



Belgium, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, Germany, Greenland, Iceland, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, European part of Russia, Slovakia and Sweden.

Other species of *Acacia* used or naturalized in the EU are given in annex C. Also for these species distribution data were compared in different databases. The results of this survey are presented in annex D.



Table 17. Distribution data of *A. dealbata*, *A. floribunda*, *A. longifolia*, *A. melanoxylon*, *A. retinodes* and *A. saligna* in different databases.

Acta Plantarum (A), Altervista (V), CABI (C), DAISIE (D), EPPO (E), Global Invasive Species Database (G), Invasoras (I), MAGRAMA (M) and Tela Botanica (T).

| SPECIES | | | | | | | | | | sl. | | | | | | | | |
|----------------------------------|-------|--------|-------|----------|--------|---------|-------|---------|--------|-----------|----------|----------|--------|---------|----|-------|---------|---------|
| | Italy | Greece | Spain | Portugal | France | Romania | Corse | Madeira | Azores | Canary Is | Baleares | Sardinia | Cyprus | Sicilia | UK | Malta | Croatia | Belgium |
| A. dealbata Link | DAVEC | | DECM | DIEC | DECT | EC | DC | D | DEC | D | D | DVEC | С | | | | EC | |
| A. floribunda (Vent.) Willd. | | | | | | | | | | | | | | | | | | |
| A. longifolia (Andrews) Willd. | GDAVC | | GDCM | GDIC | DCT | | DCT | D | D | | D | DV | | | | | | |
| A. melanoxylon R. Br. | AVC | | CDGM | DICG | DCGT | | | DI | DIC | | | DVA | | DVA | DC | | | CG |
| A. retinodes Schlecht. | GDAV | | GD | GDI | GDT | G | DT | | DG | | DG | DVA | G | VA | G | | | |
| A. saligna (Labill.) H.L. Wendl. | GDAVC | GD | GDCM | GDIC | GDCT | | DT | I | DI | D | D | DVA | DGC | DVA | | DG | | |



3.4 Cultivation areas.

Cultivation areas of individual *Acacia* species could not be identified. In Italy and France cultivation areas represent the production of *A. dealbata* and *A. retinodes*, mainly for cut flower production.

Acacia dealbata Link and Acacia retinodes Schlecht

Italy

In 2000 the total production area of *Acacia* spp. in Italy was 552 ha, of which 500 ha was in Imperia, which is in the Western part of Liguria (Petacchi, 2000). The area dropped dramatically thereafter due to pest problems, particularly *Acizzia uncatoides* (synonym *Psylla uncatoides*)(Pasini *et al.*, 2010). The website <a href="http://www.riviera24.it/articoli/2008/03/5/37562/festa-della-donna-95-mimosa-in-italia-proviene-dalla-riviera-dei-fiori_mentions a total production area of 430 ha. Over 1,600 growers produce Mimosa and the annual production in Western Liguria is about 36,000 tons. The most important varieties are *A. dealbata* 'Le Tournaire', *A. dealbata* 'le Gaulois' and *A. dealbata* 'Rustica'. They bloom in January and February. *A. retinodes*, which is often called Floribunda or Mimosa of the four seasons is also grown. It blooms from October to April. The area of *A. dealbata* remains almost stable, whereas the area of *A. retinodes* dropped dramatically.

France

In France the term Mimosas is used rather than Acacias. Mimosa trees are celebrated in the local landscape and used to promote tourism in the French Riviera. Mimosas are cultivated in plantations for the production of cut flowers. Eucalyptus trees are often interplanted to serve as a fire barrier. The seasonal production is subject to climatic factors like frost, heavy rains and too hot temperatures. The Mimosa of four seasons (A. retinodes, synonym Mimosa floribunda) is not planted much more as it needs too much water and manual care. To extend the harvesting periods from November to March the growers have extended their range of varieties and they also have found out how to force blooming. Approximately 80 % of acacia plantations are cared for by growers over 50 years old. They grow Mimosas on plantations of on average 1.5 ha. The number of plantations dropped from 200 in 1989 to 162 in 2002. In the same period the planted area dropped from 228 ha to 204 ha (http://www.acaciaworld.net/). In 2011 a total production area of 112 ha was reported (Kull et al., 2011; Griffin et al., 2011). The production is biggest in the department Alpes Maritimes (10.800.000 stalks) followed by Var (6.500.000 stalks) and minor quantities in Pyrenees Orientales and other departments. A total of 18.633.260 stalks (equivalent to approximately 600 tons) produced in 2002/2003 had a production value of approximately 3.5 million Euros (Kull et al., 2011). Two communities are responsible for 60% of the cultivated surface in Alpes Maritimes. This can be attributed to the acid soils of the Tanneron mountains, which Mimosa prefers. The soils along the Cote d'Azur are often too alkaline. In addition, the perfume industry in Grasse purchases 150-200 t of Acacia blossoms from low-income collectors harvesting from the 'wild' (Kull et al., 2011). Gardens and nurseries sell a large number of Acacia cultivars as ornamentals (Kull et al., 2011).

Portugal

Acacia dealbata, A. longifolia, A. melanoxylon, A. retinodes and A. saligna are listed as invasive in Portugal and its use, including as ornamentals, is prohibited by law (Regulated Invasive Alien Plant, 1999, Decreto-Lei n° 565/99). Nurseries are not legally allowed to sell or grow it (http://invasoras.pt/en/in-portugal/). A. floribunda is not present in Portugal (H. Marchante, pers. Comm.).

Spain

Cultivation areas were not identified for Spain. In Spain *A. dealbata* is a regulated invasive alien plant since 2011. Its use is prohibited by law (https://gd.eppo.int/reporting/article-1870).





Malta

In Malta no data were found on the *Acacia* species in this search, except on *A. saligna*. In Malta the planting, propagation, sowing and sale of *A. saligna* is illegal through the Trees and Woodlands Protection Regulations, 2001 (Brunel *et al.*, 2013).

Acacia floribunda (Vent.) Willd.

It is difficult to find out on what scale *A. floribunda* (Vent.) Willd. is cultivated as an ornamental in EU member states. In most cases the material that is offered by nurserymen as *A. floribunda* clearly is *A. retinoides* (based on description or pictures of the plants), although nurserymen do not call it *A. retinodes* in their catalogue. This is confirmed by H. Marchante (Portugal) and M. Mariotti (Italy). In the Plantfinder (2014), the name *A. floribunda* (Vent.) Willd. is mentioned, but there are no suppliers at the moment. In the PPP-index (2014) the name *A. floribunda* (Vent.) Willd. is mentioned and there are some suppliers. But it cannot be checked if they offer the true to name *A. floribunda* (Vent.) Willd. Likely most of them in fact offer *A. retinodes*. However, there are a few examples of nurseries in France and Spain that sell the true to name *A. floribunda*. In France, Florama, Pépinières Cavatore and Pépinières Saint Georges offer it. In Spain, Viveros del Sueve and Arboles Ornamentales sell the true to name *A. floribunda* (Table 18). In Italy and Greece no nurseries were found that offer the true to name *A. floribunda*. In Portugal the species is not present (H. Marchante, pers. Comm.).

The Australian website http://www.worldwidewattle.com/speciesgallery/floribunda.php indicates that A. floribunda (Vent.) Willd. is cultivated in Cels' garden in France.

There is a plant offered as *A. retinodes* var. *floribunda* (or as variety 'Floribunda'). But this is also considered as a synonym of *A. retinodes* (see http://www.gbif.org/species/2979749 and http://www.ildis.org/LegumeWeb?version~10.01&LegumeWeb&tno~5839&genus~Acacia&species~retinodes).

Table 18: Nurseries in Southern Europe that offer the true to name A. floribunda (Vent.) Willd.

| EU | nursery | URL |
|--------|-------------------|--|
| member | | |
| state | | |
| France | Florama | http://www.florama.fr/florama/111/boutique/261/acacia_floribunda.h |
| | | <u>tm</u> |
| | Pépinières | http://www.mimosa- |
| | Cavatore | cavatore.com/cavatore/0/boutique/46712/acacia floribunda.htm#.VI |
| | | AoLv50xIQ |
| | Pépinières Saint | http://www.pepiniere- |
| | Georges | stgeorges.fr/catalogue/article.php?art_id=0000001524 |
| Spain | Viveros del Sueve | http://www.delsueve.com/cat/D00051.pdf |
| | Arboles | http://www.arbolesornamentales.es/Acaciafloribunda.htm |
| | Ornamentales | |

Acacia longifolia (Andrews) Willd

Acacia longifolia is a quite commonly used shrub or tree in the subtropical parts of Europe. The species is grown by several nurseries in (Southern) Europe. In France the nurseries Florama, Jardiland, Les Botaniques du Val Douve, Pépinière de Saint Jean, Pépinières de Kerzarc'h, Pépinières Cavatore, Pépinières Eric Duval, Pépinières Saint Georges, Pépinière La Palmeraie offer this species. In Greece Best Gardens, Delta Trees and Vlachos Elias offer the species. In Italy it is offered by Fattoria Beretta, Florsilva, Margheriti Piante, Piante & Vivai, Vivai MGF, Vivai Nannini, Vivaio Noaro, Vivaio Piante la Fronda and Vivai Torsanlorenzo. In Spain the nurseries Alberola Viveros, Comunicatión Vegetal, Viveros del Sueve, Viveros Juan Peixoto and Viveros Pla del Poule offer this species (Table 19). In Portugal it is prohibited by law to cultivate this species. The PPP-index



(<u>http://www.ppp-index.de/</u>) and the Plantfinder (<u>https://www.rhs.org.uk/plants/search-form</u>) give insight in nurseries that offer the species in more northern parts of Europe. *A. longifolia* is offered by 6 nurseries in Germany and by 5 nurseries in the Netherlands. In the United Kingdom the species is offered by 3 nurseries and in the Irish Republic by 1 nursery.

Table 19: Nurseries in Southern Europe that offer *A. longifolia*.

| EU member state | Nursery | URL | | | | |
|-----------------|--------------------------|--|--|--|--|--|
| France | Florama | http://www.florama.fr/florama//boutique/270/acacia_ | | | | |
| | | <u>longifolia.htm</u> | | | | |
| | Jardiland | http://www.jardiland.com/mon-jardin/1-pepiniere/9- | | | | |
| | | plantes-de-climat-doux/10486-acacia-longifolia | | | | |
| | Les Botaniques du Val | http://www.les-botaniques-du-val-douve.com/35-8- | | | | |
| | Douve | val-douve-c-acacia-longifolia-mimosa.html | | | | |
| | Pépinières Cavatore | http://www.mimosa- | | | | |
| | | cavatore.com/cavatore/725/boutique/46719/acacia_lo | | | | |
| | | ngifolia.htm#.VIAaIv50xIQ | | | | |
| | Pépinières Eric Duval | http://www.pepinieres-duval.com/Produits/13-nos- | | | | |
| | | vegetaux/5011-arbustes-mediterraneens-/4678- | | | | |
| | 77 | acacia-longifolia-mimosa-chenille.html | | | | |
| | Pépinières de Kerzarc'h | http://www.pepinieresdekerzarch.fr/e- | | | | |
| | | catalogue/Legumineuses./ACACIA- | | | | |
| | D(: :) I D I : | longifolia/Mimosa-chenille/ref415800 | | | | |
| | Pépinière La Palmeraie | http://www.pepiniere- | | | | |
| | | palmeraie.com/boutique/Arbres-a-Feuilles- | | | | |
| | Desirable 4- Color Loca | Persistantes/Acacia/Mimosas/21/ | | | | |
| | Pépinière de Saint Jean | http://www.pepinieredesaintjean.com/details- | | | | |
| | Décinières Griet Consess | mimosa+chenille+-+acacia+longifolia-64.html | | | | |
| | Pépinières Saint Georges | http://www.pepiniere- | | | | |
| | | stgeorges.fr/catalogue/article.php?art_id=000000832 | | | | |
| Greece | Best Gardens | http://www.bestgarden.gr/plantslist.html | | | | |
| | Delta Trees | http://delta-trees.blogspot.nl/ | | | | |
| | Vlachos Elias | http://www.fytoriaalmyrou.com.gr/index.php?l=en | | | | |
| Italy | Fattoria Beretta | http://www.fattoriaberetta.it/acacia.htm | | | | |
| • | Florsilva | http://www.florsilva.it/it/catalogo-prodotti/item/344- | | | | |
| | | .html | | | | |
| | Margheriti Piante | http://www.margheriti.it/images/margheriti.pdf | | | | |
| | Piante & Vivai | http://www.piantevivai.com/alberi/acacia.html | | | | |
| | Vivai MGF | http://www.vivaiopistoia.it/system/products/pdfs/000 | | | | |
| | | /000/050/original/Acacia mimosa.pdf?1360604018 | | | | |
| | Vivai Nannini | http://www.vivainannini.com/produzione/acacia- | | | | |
| | | mimosa/alcune-varieta/?lang=en | | | | |
| | Vivaio Noaro | http://www.noarovivaio.it/main.php?i=pianta-del- | | | | |
| | | mese | | | | |
| | Vivaio Piante la Fronda | http://www.vivaiolafronda.com/le-nostre-piante/14- | | | | |
| | | a/24-acacia-longifolia.html | | | | |
| | Vivai Torsanlorenzo | http://www.vivaitorsanlorenzo.it/schede/acacia.htm | | | | |
| | Vivai Torre | http://www.vivaitorrenatale.com/Nostrepiante.aspx?g | | | | |
| | | rossisti=0&idTipoCategoria=&idSpecie=&idTipoPia | | | | |
| | | nta=&ricAlfa=&Page=1 | | | | |
| Spain | Alberola Viveros | http://tienda.alberolaviveros.com/es/arboles-de-hoja- | | | | |
| | | perenne/730-acacia-longifolia-m20.html | | | | |
| | | | | | | |



| Comunicatión Vegetal | http://www.comunicacionvegetal.com/disponibilidad | | |
|-----------------------|---|--|--|
| | -acacia-longifolia-mimosa-dorada-de- | | |
| | sidney 4_925_0.html | | |
| Viveros del Sueve | http://delsueve.com/catalogoProducto.aspx?area=- | | |
| | <u>2∏=64&pf=0</u> | | |
| Viveros Juan Peixoto | http://www.viverosjuanpeixoto.com/ | | |
| Viveros Pla del Poule | http://www.viverospladelpou.com/nuestras- | | |
| | plantas/acacia-dealbata-longifolia | | |

3.5 Ornamental use.

Sources used for retrieving information on ornamental use of Acacias are listed in Table 20.

Tables 20. Sources used to retrieve information on ornamental use of Acacias.

| Source | URL |
|-------------------------|--|
| Acacia world | http://www.acacia-world.net/ |
| AGRESTE | a 2-page statistical service of the Ministry of Agriculture, March |
| | 2005, ISBN 2-11-091011-9, |
| Dictionary of Gardening | |
| European garden Flora | |
| ILDIS Legume database | http://www.ildis.org/ |
| PFAF | http://www.pfaf.org/user/Plant.aspx?LatinName=Acacia+longifolia |

Acacias in Europe are mostly used as shrubs for landscaping (e.g. as ornamental garden plant, street tree or environmental for natural landscaping or soil-stabilization (erosion control)). Some species are used as cut flower. Other species have valuable timber. Other uses include the production of medicines, chemical products and perfumes and soaps.

Acacia floribunda (Vent.) Willd.

The true to name A. floribunda can be used as an ornamental shrub in gardens, cities and agricultural areas. There are no indications that the species is used for other purposes. In the ILDIS database the use of this species worldwide is only reported as environmental.

Acacia longifolia (Andrews) Willd.

Acacia longifolia is a quite commonly used shrub or tree in the subtropical parts of Europe. The species is grown by several nurseries in (Southern) Europe (chapter 3.4). A. longifolia can be used as an ornamental shrub or small tree in gardens, in cities and in or agricultural areas. The species is also used in natural areas, e.g. for soil-stabilization in dunes (erosion control). For the production of chemical products (e.g. tannins from the bark) the species is worldwide of minor importance. In Europe the species is not grown for this purpose. No other uses have been reported.

Acacia dealbata Link

Acacia dealbata is used as a cut flower in Southern Europe (chapter 3.4). The flowers are also used for the production of high grade perfume. A. dealbata is often planted in gardens, parks and along the roadside. In Spain it is a very common street tree (Guia del arbolado de la ciudad de Valencia (Ajuntament de Valencia, 2000, Guardia, 1992). It is also used as a tub plant. The timber is useful for furniture and indoor work, but has limited uses.



Acacia melanoxylon R. Br.

Acacia melanoxylon can be used as an ornamental in gardens and parks. It is also used as a street tree. In the twentieth century it was often used in forestation programmes in coastal dunes. A. melanoxylon (blackwood) has high-quality wood, that is used for carpentry and cabinet-making in its natural region. In Portugal its wood is used for timber.

Acacia retinodes Schlecht

Acacia retinodes is used as a cut flower, as ornamental tree and as an environmental.

Acacia saligna (Labill.) H.L. Wendl

Acacia saligna is used for environmental rehabilitation, soil stabilisation, animal fodder, tannin production, windbreaks, ornamental use and as a source of fuel wood.

3.6 Hybrids and varieties on the ornamental market.

Sources used for retrieving information on hybrids and varieties of Acacias are listed in Table 21.

Tables 21. Sources used to retrieve information on hybrids and varieties of Acacias.

| Source | URL | |
|---|---|--|
| Giardini & Ambiente | http://www.giardini.biz/piante/alberi/acacia- | |
| | dealbata-mimosa/ | |
| List of Names of Woody Plants and Perennials. | http://www.internationalplantnames.com | |
| Hoffman, M.H.A. (2010) | | |
| Mimosas pour le climat méditerranéen | | |
| (Jacquemin, 1997) | | |
| PPP-index | http://www.ppp-index.de | |
| RHS Plantfinder | https://www.rhs.org.uk/plants/search-form | |

An overview of varieties available at European nurseries is given in Table 22. The list also includes botanical varieties and subspecies available at European nurseries. Bold names are preferred names.

Table 22. Overview of varieties of Acacia available at European nurseries.

| Species | Cultivar | | |
|-----------------|--|--|--|
| Acacia dealbata | Acacia 'Mireille' (syn. A. dealbata 'Miereille') | | |
| | Acacia 'Rustica' (syn. A. dealbata 'Rustica' | | |
| | Acacia dealbata 'Argentea' | | |
| | Acacia dealbata 'Bon Accueil' | | |
| | Acacia dealbata 'Gaulois Astier' (syn. A. 'Gaulois var. Astier') | | |
| | Acacia dealbata 'Innesto' | | |
| | Acacia dealbata 'Kambah Karpet' (syn. A. dealbata var. Kambah | | |
| | Carpet) | | |
| | Acacia dealbata 'Le Gaulois' (syn. A. 'Gaulois'; A. dealbata 'Gallic') | | |
| | Acacia dealbata 'Le Tournaire' (syn. A. 'Tournaire') | | |
| | Acacia dealbata 'Turner' (may be the same as 'Tournaire') | | |
| | Acacia dealbata 'Mirandole' (syn. A. 'Mirandole') | | |
| | Acacia dealbata 'Pendula' (syn. A. dealbata var. pendula) | | |
| | Acacia dealbata var. contorta | | |
| | Acacia dealbata 'Petit Vert' | | |



| | Acacia dealbata 'President Doumerge' (syn. A. 'President |
|-------------------|--|
| | Doumergue') |
| | Acacia dealbata 'Rêve d'Or' |
| | Acacia dealbata 'Ste. Hélène' |
| | Acacia dealbata 'Super Lisette' |
| | Acacia dealbata 'Virginia Pendula' |
| | Acacia dealbata 'Virginia' |
| | Acacia dealbata subsp. subalpina |
| | Acacia dealbata var. dealbata |
| Acacia floribunda | Acacia floribunda 'Gippsland Gold' (variegated cv; probably not in |
| | Europe) |
| Acacia longifolia | Acacia longifolia var. pendula |
| | Acacia longifolia var. praecox |
| | Acacia longifolia var. longifolia |
| | Acacia longifolia 'Bega d'oro |
| | Acacia longifolia 'Exmouth' |
| | Acacia longifolia subsp. sophorae |
| Acacia retinodes | Acacia retinodes 'Glauca' |
| | Acacia retinodes 'Imperialis' |
| | Acacia retinodes 'Jean-Pierre' |
| | Acacia retinodes 'Lisette' |
| | Acacia retinodes 'Palme d'Or' |
| | Acacia retinodes var. retinodes |
| | Acacia retinodes var. unicifolia |
| Acacia saligna | Acacia saligna var. provincialis |
| others | Acacia 'Cascade' (syn. A. cultriformis 'Cascade') |
| | Acacia 'Clair de Lune' (syn. A. howittii 'Claire de Lune') |
| | Acacia 'Exeter Hybrid' |
| | Acacia 'Winter Gold' (syn. A. amblygona 'Winter Gold') |
| | |

Important cultivars of A. dealbata include Acacia dealbata 'Mirandole' (syn. A. 'Mirandole') (60% surface), Acacia dealbata 'Le Gaulois' (30% surface) and Acacia dealbata 'Gaulois Astier' (syn. A. 'Gaulois var. Astier')(10% surface). Other cultivars used are Acacia dealbata 'President Doumerge' (syn. A. 'President Doumergue'), Acacia 'Mireille' (syn. A. dealbata 'Miereille') and Acacia dealbata d'Or'. These cultivars multiply only by grafting ((http://www.acaciaworld.net/index.php/europe/acacias-introduction-to-france/mimosa-trees-and-pots, Jacquemin (1997). Important cultivars of A. retinodes include Acacia retinodes 'Glauca', Acacia retinodes 'Lisette' and Acacia retinodes 'Imperialis'. As A. retinodes tolerates alkaline soils, nurseries graft A. dealbata onto (http://www.acaciaretinoides, which, however, is less frost resistant world.net/index.php/europe/acacias-introduction-to-france/mimosa-trees-and-pots). Rootstocks propagated from seed. As the seeds have hard seedcoats impervious to water, the seeds need some presowing treatment to overcome seedhardedness. Risky treatments based on hot water or acid scarification can be used http://www.fao.org/docrep/006/q2190e/q2190e07.htm.

Cultivars of *A. longifolia* are propagated by grafting. *A. floribunda* and *A. saligna* are multiplicated by seed (Jacquemin, 1997). *Acacia melanoxylon* is propagated by seed or by grafting (Jacquemin, 1997).

3.7 Pest management

Acacia species are subject to several pests and diseases.

Acizzia uncatoides (synonym Psylla uncatoides)

Since 1975, *Acizzia uncatoides* (synonym *Psylla uncatoides*) (originating from New Zealand) has been observed damaging various parts of mimosa (Acacia spp.) in Liguria (Arzone and Vidano, 1985). The



most susceptible mimosas appeared to be *A. longifolia* var. floribunda and *A. dealbata* cv. Turner. Although Arzone and Vidano (1985) mention that *A. longifolia* var. floribunda and *A. dealbata* cv. Turner are the most susceptible Mimosas for *Acizzia uncatoides*, it is not very likely that this paper is indeed on *A. longifolia* var. floribunda, which is a synonym of *A. floribunda*. *Acacia floribunda* is not grown in Liguria for cut flower production and it is not likely that a pest study is done on this species. Most obviously, the study was on *A. retinodes*, which is often called *A. retinodes* var. floribunda or 'Floribunda'. *Acizzia uncatoides* is the most important limiting factor for the culture of mimosas in Liguria. Many growers stopped growing mimosa due to problems with this pest.

Action is required as soon as first symptoms appear. It is necessary to reach even the most protected parts of the plant. Many chemicals have been listed that can be used against this pest. It has been advised to alternate active ingredients to avoid development of pesticide resistance. A typical spraying programme apparently consists of 6 to 8 insecticide applications per season (Pasini *et al.*, 2010 http://www.comunicazionediretta.com/styled-25/downloads-

<u>2/files/Speciale_Psilla_in_mimosa_floribunda.pdf</u>). http://www.fitodifesa.it/ornamentali/90-mimosa.html

In 2000 the abundance of coccilinids was studied in farms in Liguria. A scheme was presented on crop protection, probably against aphids and *Acizzia uncatoides*: 8/7 Imidacloprid, 8/8 Monocrotofos, 18/8 Monocrotofos, 30/8 Etofenprox, 16/9 Etofenprox, 25/9 Imidacloprid, 9/6 Metomil, 13/7 Parationmetil, 25/7 Metomil, 1/8 Imidacloprid, 28/8 Imidacloprid + Etofenprox, 22/9 Imidacloprid + Etofenprox (Boddi *et al.*, 2005).

Rapisarda et al., (1985) advised chemical control with pyrethroids or phosphoric esters. Biological control of this pest is difficult.

Jacquemin (1997) mentions that the black ladybug *Stethorus punctillum* may be used for biological control. Alternatively, chemicals can be used.

Acizzia acaciae-baileyanae (synonym Psylla acaciae-baileyanae)

Acizzia acaciae-baileyanae was first recorded in France in 1981. At least until 1997 no damage was observed in Acacia in France (Malausa et al., 1997)

Aphid sp.

As soon as first aphids appear, intervention is necessary. Products can be used based on Alfametrin (FASTAC), dimethoate (PERFEKTHION NEW) or aphid-specific products (Imidacloprid). http://www.fitodifesa.it/ornamentali/90-mimosa.html.

Cocciniglie cotonose

As soon as first symptoms appear, products should be used containing chlorpirifos (TERIAL 75 WG). http://www.fitodifesa.it/ornamentali/90-mimosa.html

Frankliniella occidentalis

Frankliniella occidentalis, the western flower thrips causes malformations of the twigs and the flowers. They can also transfer viruses and bacteria. Quick action is required when first symptoms appear. Products can be used containing Spinosad (TRACER 120 SC), dimethoate (PERFEKTHION NEW), chlorpirifos (TERIAL 75 WG).

http://www.fitodifesa.it/ornamentali/90-mimosa.html



Forficula auricularia

The use of insecticides against *Forficula auricularia*, the common earwig is not very satisfactory. One useful control method is that of placing cardboard sleeves around the base of the trunk. Other methods include the periodic brushing of a synthetic sticky substance around the base of the trunk to stop the pest reaching the branches, and the use of poisoned baits (Colombo and Fasce, 1993).

Icerya purchasi

Icerya purchasi (Cottony cushion scale) can be biologically controlled by the ladybug *Rhodolia cardinalis*. White oil-based insecticides are effective in spring and summer (http://www.mimosa-cavatore.com/cavatore/1368/maladies et ravageurs .htm)

Metcalfa pruinosa

Preventive tips include: Keep trees open, spray heavily every night under the leaves and avoid destroying natural predators, like lizards. In case of an infection intense spraying with water is recommended to remove insects and sooty mold from the trees. Then pyrethrum can be used. Biological control is possible by *Neodryinus typhlocybae*.

Forficula auricularia

The use of insecticides against *Forficula auricularia*, the common earwig is not very satisfactory. One useful control method is that of placing cardboard sleeves around the base of the trunk. Other methods include the periodic brushing of a synthetic sticky substance around the base of the trunk to stop the pest reaching the branches, and the use of poisoned baits (Colombo and Fasce, 1993).

Armillaria mellea

This disease is difficult to control. It is recommended to sterilize the soil before planting. Infected plants should be destroyed (http://www.fitodifesa.it/ornamentali/90-mimosa.html).

Cylindrocladium pauciramosum

Cylindrocladium pauciramosum, that causes severe leaf spotting was observed for the first time in Southern Italy on A. retinodes (Polizzi and Catara, 2001). Small seedlings in the nursery are very susceptible for this fungus. It is advised to sterilize the soil before planting and to use preventive chemicals. Preventive measures should also include a healthy growing environment. In case of attack, infected plants should be destroyed.

(http://www.mimosa-cavatore.com/cavatore/1368/maladies et ravageurs .htm, http://www.fitodifesa.it/ornamentali/90-mimosa.html).

Erisiphe polygoni

This fungus can be easily treated by regular sulphur applications (Jacquemin, 1997).

Fusarium lateritium

Fusarium lateritium was reported as a relatively rare fungus on Acacia in 1997. At that moment there were little possibilities to combat it (Jacquemin, 1997).



Phytophtora cinnamomi

It is advised to sterilize the soil before planting and to avoid entrapment of moisture. The use of specific products is advised, e.g. Propamocarb or Metalaxyl. Infected plants should be destroyed http://www.mimosa-cavatore.com/cavatore/1368/maladies_et_ravageurs_.htm, http://www.fitodifesa.it/ornamentali/90-mimosa.html).

Phytophthora taxon niederhauserii

Phytophthora taxon niederhauserii was found for the first time in a commercial nursery in Liguria on 6- to 10-month-old potted plants of *A.dealbata* (Faedda *et al.*, 2013).

Verticillium dahliae

The control of *Verticillium dahliae* is difficult. Infected plants should be removed and burned. It is advised to sterilize the soil before planting. Products based on Procloraz or Thiofanate-methyl can be used (http://www.fitodifesa.it/ornamentali/90-mimosa.html).

Sooty mold

Sooty mold grows on honeydew produced by insects. It is caused by several fungi. To prevent sooty mold insects should be combatted.

3.8 Paraserianthes lophantha

Trees of *Paraserianthes lophantha* (syn. *Albizia* lophantha) growing in the vicinity of *A. longifolia* trees that were seriously galled by the bud galling wasp *Trichilogaster acaciaefoliae*, have been observed occasionally to carry small, sparsely distributed galls. Effects have been proven negligible and temporary (Dennill *et al.*,1999; Hill, 2005).

On request of EFSA a quick search was done on the distribution of *Paraserianthes lophantha* in EU member states. Distribution maps for Italy, Portugal and France are presented in Figure 10. The invasive species databases of MAGRAMA (Spain) and DinamisGlobe (Iberian Peninsula) did not include distribution maps of *P. lophantha*. The presence of *P. lophantha* in different provinces/departments/regions in Portugal, France and Italy is given in Table 23. Herrero-Borgoñón Perez (2007) reported the first presence of *P. lophantha* in the Castéllon province in Spain *P. lophantha* is are not included in the Nobanis database for invasive species in North and Central Europe.

Table 23: The presence of *P. lophantha* in different parts in Italy, Portugal, Spain and France.

| Country | Present in | Remarks |
|----------|---|---|
| Italy | Toscana, Campania, Calabria, Sicilia, | |
| - | Sardinia | |
| Portugal | Mainland Portugal (Douro Litoral, Beira | |
| | Litoral, Estremadura, Alto Alentejo, | |
| | Algarve), Madeira archipelago (islands of | |
| | Madeira and Porto Santo). | |
| Spain | South and East of the Iberian Peninsula and | http://www.magrama.gob.es/es/biodiversi |
| | Canaries | dad/temas/inventarios- |
| | | nacionales/c5_tcm7-22147.pdf |
| | | |
| France | Corse (present) Var (present), Alpes | |
| | maritimes (presence to be confirmed) | |



The DAISIE database also gives data on the presence of *P. lophantha* in different EU member states (Table 24). The EPPO PQR Database, the Global Invasive Species Database, the ILDIS Legume Database and and the Invasive Species Compendium do not present data of *P. lophantha* in different EU member states

Table 24: Status of *P. lophantha* in different EU member states.

| Country | Status |
|----------------|-----------------------|
| Azores | Alien established |
| Baleares | Alien not established |
| Canary Islands | Alien unknown |
| Corse | Alien established |
| France | Alien unknown |
| Italy | Alien established |
| Madeira | Alien established |
| Portugal | Alien not established |
| Sardinia | Alien established |
| Sicily | Alien established |
| Spain | Alien established |

A small search was done on cultivation of *P. lophantha* in EU member states. Nurseries were identified that offer this species, both in Western Europe and in Southern Europe. *Paraserianthes lophantha* is offered by 1 nursery in the Netherlands (PPP-index http://www.ppp-index.de/), 4 nurseries in the UK (the Plantfinder (http://www.ppp-index.de/)) and 1 nursery in Belgium)(http://www.hulsdonk.com).

Nurseries in Southern Europe that offer this species are listed in Table 25. No nurseries were found in Italy, Spain and Greece.

Table 25: Nurseries in Southern Europe that offer *P. lophantha*.

| EU member state | Nursery | URL |
|-----------------|---------------------------|---|
| France | Les Botaniques du Val | http://www.les-botaniques-du-val-douve.com/169- |
| | Douve | 10-val-douve-c-paraserianthes-lophantha-plante-a- |
| | | floraison-printaniere.html |
| | Pépinière Ezavin | http://www.pepinieres- |
| | _ | ezavin.com/mdf_def/catfleurs.htm |
| | Pépinières Issa des Hauts | http://pepiniereissa.fr/ |
| | de Valcyre | |



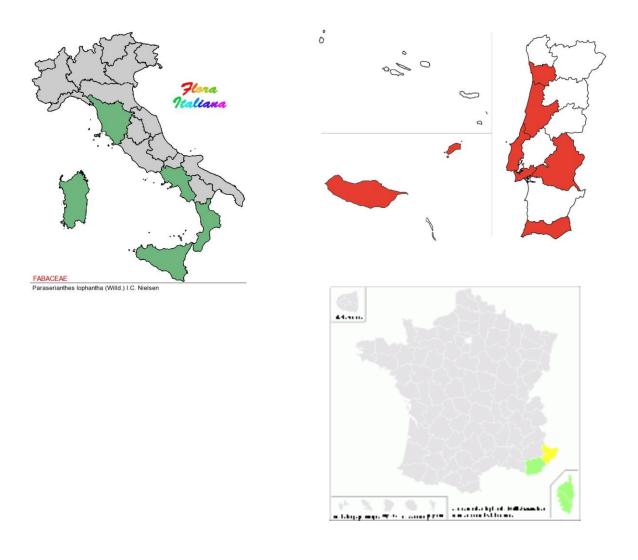


Figure 10. Distribution of *P. lophantha* in Italy, Portugal, Spain and France. http://185.31.159.10/~invasora/wp-content/uploads/2012/10/Paraserianthes-lophantha_en.pdf http://luirig.altervista.org/flora/taxa/index1.php?scientific-name=paraserianthes+lophantha http://www.tela-botanica.org/bdtfx-nn-47910

4. CONCLUSIONS

This extensive literature search gave good insight both in the distribution in the wild and in cultivation aspects of the *Acacia* species under study.

Acacia floribunda (Vent.) Willd. is not distributed as invasive plant or environmental in Europe. It does not appear in any botanical source, including databases on invasive plants. For cultivation as ornamental it is only available at a very small scale. Few nurseries in France and Spain offer the true to name Acacia floribunda (Vent.) Willd. Based on descriptions and pictures of plants it turned out that in most cases plants offered under the name A. floribunda are in fact A. retinoides Schltdl. The true to name A. floribunda can be used as an ornamental shrub in gardens, in cities and in agricultural areas.

Acacia longifolia is one of the most prolific invaders in France, Italy, Portugal and Spain. It is the most prominent and widespread invader in Portuguese dunes. The species occurs in most provinces in Portugal, in the north western part of Spain, in some southern parts of France and in parts of Italy. It was not only recorded on the mainland, but also on the islands of Corse, Azores, Madeira, Baleares



and Sardinia. Detailed data on areas are not available, with a few exceptions, e.g. in the coastal region of Portugal 2850 ha of *A. longifolia* is recorded between Pedrogão and S. Jacinto (= 12% of the 24,000 ha coastal strip)(Kull *et al.*, 2011). *A. longifolia* was not recorded in the wild in any other EU member state.

Acacia longifolia is a quite commonly used shrub or tree in the subtropical parts of Europe. The species is grown by quite some nurseries in Italy, France, Spain and Greece. In Portugal it is prohibited by law to cultivate this species, as is also the case for A. dealbata, A. melanoxylon, A. retinodes and A. saligna. Moreover A. longifolia is grown by some nurseries in more northern parts of Europe (Germany, the Netherlands, Irish Republic and UK). A. longifolia can be used as an ornamental shrub or small tree in gardens, in cities and in agricultural areas. As such it is not only present in southern Europe, but also in Belgium and UK. The species is also used in natural areas, e.g. for soil-stabilization in dunes (erosion control).

The Acacias grown in France and Italy for cut flower production principally are *A. dealbata* and *A. retinodes*, of which *A. dealbata* is the most important. In 2000 the total production area of *Acacia* spp. in Italy was 552 ha, of which 500 ha was in Imperia. The area dropped dramatically thereafter due to pest problems, particularly *Acizzia uncatoides* (synonym *Psylla uncatoides*). In France the total production area dropped from 204 ha in 2002 to 112 ha in 2011. The production is biggest in Alpes Maritimes and Var. In addition, 150-200 tonnes of Acacia blossoms are collected in the wild for the production of high-grade perfume. *A. dealbata* is often planted in gardens, parks and along the roadside. *A. retinodes* is also used as ornamental tree and as an environmental. Many varieties and cultivars are on the market, especially from *A. dealbata*.

Both species are invasive. *A.dealbata* is one of the most prolific invaders in Portugal, Spain, Italy and France. It occurs in all provinces in Portugal, in the north western part of Spain, and in quite some areas in France and Italy. *A. dealbata* was also recorded in Croatia, Cyprus, Romania, Sweden and the non EU member state Switzerland.

Acacia retinodes was recorded in the wild in big parts of Portugal and in some parts of Italy and France. It was not recorded in Spain. Other countries were the species is recorded in the wild include Croatia, Cyprus, Romania and the UK.

Acacia melanoxylon is also one of the most prolific invaders in France, Italy, Portugal and Spain. It occurs in all provinces in Portugal, in the north western part of Spain, in the south eastern part of France and in some parts of Italy. It was also recorded in Belgium and the UK. A. melanoxylon can be used as an ornamental in gardens and parks. It is also used as a street tree. In Portugal its wood is used for timber.

Acacia saligna is the most invasive Acacia species in Italy. It is present in nine regions in Italy, including Sicily and Sardinia, in big parts of Portugal, in the south eastern part of France, including Corse and in North-West Spain. A. saligna is also present in Croatia, Cyprus, Greece and Malta. In Cyprus it is the most serious invasive species (Hadjikyriakou and Hadjisterkotis, 2002, Dufour-Dror, 2013) and in Malta it is one of the major plant invaders. A. saligna is used as an ornamental. Other uses include environmental rehabilitation, soil stabilisation, animal fodder, tannin production, windbreaks, and source of fuel wood.

Acacia species are subject to several pests and diseases. Important pests include Acizzia uncatoides (syn. Psylla uncatoides), aphids, Frankliniella occidentalis (thrips), Metcalfa pruinosa and cotton scale. The major pathogen is Armillaria mellea, which is difficult to control. Pest problems are the main reason for serious reductions in cultivation areas, both in Italy and in France.

Egg laying of *Trichilogaster acaciaefoliae* has also been observed on the tree *Paraserianthes lophantha*. Therefore, a small inventory was done on the distribution and cultivation of *P. lophantha* in EU member states. *P. lophantha* is present in the wild in some regions/provinces in Italy and Portugal, in the South Eastern part of France and in Spain. The species is cultivated as ornamental, both in Southern Europe and in Western Europe, probably on a limited scale.



The presented results on occurrence in the wild and cultivation of *A. longifolia* and *A. floribunda*, - which are both hosts of the bud galling wasp *Trichilogaster acaciaefoliae* - in EU member states are a good basis to assess the risk to plant health that would pose a voluntary release of the bud galling wasp *Trichilogaster acaciaefoliae* in the Union territory for the biological control of the invasive alien plant *Acacia longifolia* (Andrews) Willd.

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Invasive species databases and the Legume Web.

| Source | URL |
|-------------------------------------|--|
| Acta Plantarum (Italy) | http://www.actaplantarum.org |
| Altervista Flora Italiana (Italy) | www.luirig.altervista.org |
| DAISIE | http://www.europe-aliens.org |
| DinamisGlobe (Portugal, Spain) | http://www.dinamisglobe.org/pt/ |
| EPPO PQR Database | http://www.eppo.int/DATABASES/pqr/pqr.htm |
| Global invasive species information | http://www.gisin.org |
| network | |
| Global Invasive Species Database | http://www.issg.org/database/welcome/ |
| ILDIS Legume Database | http://www.ildis.org/ |
| Invasive Species Compendium | http://www.cabi.org/isc |
| Invasoras (Portugal) | http://invasoras.pt |
| Inventaire National du Patrimoine | http://inpn.mnhn.fr/espece/cd_nom |
| Naturel (France) | |
| Magrama (Spain) | http://www.magrama.gob.es/es/biodiversidad/temas/inventa |
| | rios-nacionales/inventario-especies-terrestres/inventario- |
| | nacional-de- |
| | biodiversidad/ieet_flora_vasc_aloct_invas_cientifico_a.asp |
| | <u>X</u> |
| Nobanis database | http://www.nobanis.org/default.asp |
| Tela Botanica (France) | http://www.tela-botanica.org |

Invasive species databases and relevant datasheets on A. dealbata, A. longifolia, A. melanoxylon, A. retinodes and A. saligna.

| Database | Species | URL |
|------------|--------------------|--|
| DAISIE | Acacia dealbata | http://www.europe- |
| | | aliens.org/pdf/Acacia_dealbata.pdf |
| | Acacia longifolia | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | 2773# |
| | Acacia melanoxylon | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | <u>2793#</u> |
| | Acacia retinodes | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | 2810# |
| | Acacia saligna | http://www.europe- |
| | | aliens.org/speciesFactsheet.do?speciesId=1 |
| | | 2823# |
| Invasive | Acacia dealbata | http://www.cabi.org/isc/datasheet/2207 |
| Species | Acacia longifolia | http://www.cabi.org/isc/datasheet/2312 |
| Compendium | Acacia melanoxylon | http://www.cabi.org/isc/datasheet/2329 |
| | Acacia saligna | http://www.cabi.org/isc/datasheet/2402 |
| Invasoras | Acacia dealbata | http://invasoras.pt/wp- |
| | | content/uploads/2012/10/Acacia- |
| | | <u>dealbata_en.pdf</u> |
| | Acacia longifolia | http://invasoras.pt/wp- |
| | | content/uploads/2012/10/Acacia- |
| | | <u>longifolia_en.pdf</u> |
| | Acacia melanoxylon | http://invasoras.pt/en/gallery/acacia- |



| | | melanoxylon-en/ | | | | | | | |
|--------------|--------------------|---|--|--|--|--|--|--|--|
| | Acacia retinodes | http://invasoras.pt/en/gallery/acacia- | | | | | | | |
| | | retinodes-en/ | | | | | | | |
| | Acacia saligna | http://invasoras.pt/wp- | | | | | | | |
| | G | content/uploads/2012/10/Acacia- | | | | | | | |
| | | saligna_en.pdf | | | | | | | |
| DinamisGlobe | Acacia dealbata | http://www.dinamisglobe.org/pt/plantas- | | | | | | | |
| | | invasoras?hashid=9f61408e3afb633e50cdf1 | | | | | | | |
| | | b20de6f466&doAction=show | | | | | | | |
| | Acacia longifolia | http://www.dinamisglobe.org/pt/plantas- | | | | | | | |
| | 3.0 | invasoras?hashid=735b90b4568125ed6c3f6 | | | | | | | |
| | | 78819b6e058&doAction=show | | | | | | | |
| | Acacia melanoxylon | http://www.dinamisglobe.org/pt/plantas- | | | | | | | |
| | · | invasoras?hashid=7cbbc409ec990f19c78c7 | | | | | | | |
| | | 5bd1e06f215&doAction=show | | | | | | | |
| | Acacia retinodes | http://www.dinamisglobe.org/pt/plantas- | | | | | | | |
| | | invasoras?hashid=d2ddea18f00665ce8623e | | | | | | | |
| | | 36bd4e3c7c5&doAction=show | | | | | | | |
| | Acacia saligna | http://www.dinamisglobe.org/pt/plantas- | | | | | | | |
| | | invasoras?hashid=ea5d2f1c4608232e07d3a | | | | | | | |
| | | a3d998e5135&doAction=show | | | | | | | |
| Magrama | Acacia dealbata | http://www.magrama.gob.es/es/biodiversida | | | | | | | |
| | | <u>d/temas/inventarios-</u> | | | | | | | |
| | | nacionales/acacia dealbata tcm7- | | | | | | | |
| | | <u>21485.pdf</u> | | | | | | | |
| | Acacia longifolia | http://www.magrama.gob.es/es/biodiversida | | | | | | | |
| | | d/temas/inventarios- | | | | | | | |
| | | nacionales/acacia_longifolia_tcm7- | | | | | | | |
| | | <u>21486.pdf</u> | | | | | | | |
| | Acacia melanoxylon | http://www.magrama.gob.es/es/biodiversida | | | | | | | |
| | | d/temas/inventarios- | | | | | | | |
| | | nacionales/acacia_melanoxylon_tcm7- | | | | | | | |
| | | <u>21487.pdf</u> | | | | | | | |
| | Acacia saligna | http://www.magrama.gob.es/es/biodiversida | | | | | | | |
| | | d/temas/inventarios- | | | | | | | |
| | | nacionales/acacia_saligna_tcm7-21488.pdf | | | | | | | |



APPENDIX/APPENDICES

Appendix A. Overview of numbers of hits resulting from searches in CAB Abstracts and AGRIS on several common names and synonyms of *A. floribunda, A. longifolia, A. retinodes, A.dealbata* and *A. saligna.*

Names yielding hits were included in the search strategy.

| A. floribunda | Hits | Remarks | Included | Hits in | Remarks | Included |
|-------------------|------|----------------|-----------|---------|--------------|-----------|
| | in | | in search | AGRIS | | in search |
| | CAB | | strategy | | | strategy |
| | | | CAB | | | AGRIS |
| catkin wattle | 0 | | no | 0 | | no |
| gossamer wattle | 0 | | no | 0 | | no |
| grossamer wattle | 0 | | no | 0 | | no |
| river wattle | 0 | | no | 1 | South Africa | no |
| sally wattle | 1 | Is A. salicina | no | 1 | Is A. | no |
| | | | | | glaucescens | |
| weeping acacia | 0 | | no | 0 | | no |
| white sallow | 0 | | no | 0 | | no |
| white sally | 0 | | no | 0 | | no |
| A. angustifolia | 0 | | no | 0 | | no |
| A. intermedia | 0 | | no | 0 | | no |
| Mimosa floribunda | 2 | | yes | 0 | | yes |
| Phyllodoce | 0 | | yes | 0 | | yes |
| floribunda | | | | | | |
| Racosperma | 0 | | yes | 0 | | yes |
| floribundum | | | | | | |

| A. longifolia | Hits | Remarks | Included | Hits in | Remarks | Included |
|--------------------|------|---------------|-----------|---------|-----------|-----------|
| | in | | in search | AGRIS | | in search |
| | CAB | | strategy | | | strategy |
| | | | CAB | | | AGRIS |
| coast wattle | 7 | | yes | 0 | | no |
| coastal wattle | 3 | 1x A. | no | 1 | Australia | no |
| | | longifolia | | | | |
| | | Australia and | | | | |
| | | South Africa | | | | |
| | | 1x Western | | | | |
| | | coastal | | | | |
| | | wattle (A. | | | | |
| | | cyclops), | | | | |
| | | 1x A . | | | | |
| | | sophorae | | | | |
| golden rod | 0 | Always | no | 0 | Always | no |
| | | Solidago, no | | | Solidago | |
| | | Acacias | | | _ | |
| golden wattle | 17 | | yes | 3 | | yes |
| longleaf wattle | 0 | | no | 0 | | no |
| longleaved wattle | 0 | | no | 0 | | no |
| long leaved wattle | 3 | | yes | 0 | | no |
| sallow wattle | 0 | | no | 0 | | no |



| A. latifolia | 1 | India | yes | 0 | yes |
|-------------------|---|-------|-----|---|-----|
| A. trinervis | 0 | | no | 0 | no |
| Mimosa longifolia | 0 | | yes | 0 | no |
| Mimosa | 0 | | yes | 0 | yes |
| macrostachya | | | | | |
| Phyllodoce | 0 | | no | 0 | yes |
| longifolia | | | | | |
| Racosperma | 0 | | yes | 0 | yes |
| longifolium | | | | | |

| A. retinodes | CAB | Remarks | Included in search strategy CAB | AGRIS | Remarks | In search AGRIS |
|--------------|-----|---------|--|-------|---------|--------------------|
| swamp wattle | 0 | | no | 0 | | no |
| water wattle | 0 | | no | 0 | | no |

| A. dealbata | CAB | Remarks | Included in search strategy CAB | AGRIS | Remarks | In search AGRIS |
|---------------|-----|---------|--|-------|---------|--------------------|
| silver wattle | 242 | | yes | 6 | | yes |

| A. saligna | CAB | Remarks | Included in search strategy CAB | AGRIS | Remarks | In search AGRIS |
|----------------------------|-----|--|--|-------|---------|--------------------|
| golden wreath wattle | 1 | Also results from search on A. saligna | no | 0 | | no |
| port Jackson willow | 3 | South Africa only | no | 0 | | no |
| A. cyanophyll* not saligna | 4 | | yes | 13 | | yes |



Appendix B. Overview of organisations that did not yield relevant information on Acacia spp.

| Country | Organisation | URL |
|----------|--|---|
| Cyprus | Agricultural Research Institute, Nicosia | http://www.moa.gov.cy/moa/ari/ari.nsf/p |
| | | age01_en/page01_en?OpenDocument&E |
| | | xpandSection=8 |
| | Union Catalog Hellenic Academic Libraries | http://www.unioncatalog.gr/ucportal/inde |
| | TEVALO A OFINO HADIFIEDINA | x.php?lang=en |
| | ΤΕΧΝΟΛΟΓΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ | http://ktisis.cut.ac.cy/ |
| France | KYIIPOY The National Institute of Horticulture, | http://library.cut.ac.cy/ |
| France | | http://www.inh.fr/enseignements/lan |
| | NIH, Angers, France | gues/contents/inh.pdf |
| | AgroCampus Ouest, France | http://www.agrocampus- ouest.fr/infoglueDeliverLive/ |
| | France Academy of Agriculture | http://www.academie-agriculture.fr/ |
| | France Academy of Agriculture Universite Paris Sud | |
| | Université Paris Sud | http://catalogue.scd.u-psud.fr/cgi- |
| <u> </u> | Di , i | bin/koha/opac-search.pl |
| Germany | Phytomed | http://phytomed.jki.bund.de/ |
| Greece | Benaki Phythopathological Institute | http://en.bpi.gr/section.aspx?id=6&su |
| | *** | <u>bid=101</u> |
| | University of Thessaly, Dept. of | |
| | Agriculture Crop Production & Rural | http://www.agr.uth.gr/main/index_en |
| | Environment, Lab. of Agricultural | <u>.html</u> |
| | Constructions and Env. Contr., Volos | |
| | Agricultural University of Athens, Faculty | http://efp.aua.gr/en |
| | of Crop Science | |
| | Aristotle University of Thessaloniki, | http://www.agro.auth.gr/eng/index.ht |
| | Faculty of Agriculture, Lab. of | <u>m</u> |
| | Alternative Energy Sources in | |
| | Agriculture, Thessaloniki | |
| | National Archive of PhD Theses | http://phdtheses.ekt.gr/eadd/ |
| | Mediterranean Agronomic Institute of | http://library.maich.gr/cgi-bin- |
| | Chania | EN/egwcgi/egwirtcl/targets.egw |
| | Institute of Viticulture, Floriculture and | http://www.nagref- |
| | Vegetable Crops of Heraklion | her.gr/en/content/institute-viticulture- |
| | | floriculture-and-vegetable-corps- |
| | | <u>heraklion</u> |
| | EKT databases: Greek forestry and nat. | http://argo.ekt.gr/ |
| | environment & Vegetable and animal | |
| | production | |
| | National Documentation Centre EKT | http://www.ekt.gr/en/ |
| | Helios: National Hellenic Research | http://helios-eie.ekt.gr/EIE/ |
| | Foundation Repository | |
| | BPI e-Repository | http://83.235.16.144:8080/jspuien/ |
| | | |
| Italy | University of Bari - Biologia e chimica | http://www.uniba.it/ricerca/dipartime |
| | agro-forestale e ambientale | nti/dibca |
| | University of Turin, Faculty of | http://www.eclas.org |
| | Agriculture, Turin, Italy | |
| | Università degli Studi di Palermo, Facoltà | http://portale.unipa.it/amministrazion |
| | di Agraria | e/area1/ssp04/ |
| | | |
| | Università della Tuscia, Viterbo, Italy, | http://www.uniscape.eu/pageLocSm. |
| | Dipartimento di Scienze e Tecnologie per | php?idM=2&idFam=1&idlna=1&lan |



| | l'Agricoltura, le Foreste, la Natura e | <u>g=en</u> | | | | |
|-------------|--|---|--|--|--|--|
| | l'Energia | 1 | | | | |
| | University of Naples Federico II, Facoltá di Agraria, Portici, Naples, Italy | http://www.agraria.unina.it:20100/fa colta/pubNews/home.do?codFacolta =13 | | | | |
| | University of Catania, Department of | http://www.unict.it/en/libraries-and- | | | | |
| | Agriculture and Food Science, Italy | documentation-centre-cbd-0 | | | | |
| | Agricultural Research Council, Research | http://sito.entecra.it/portale/cra_dati_i | | | | |
| | Centre for Soil-Plant System, Rome, Italy | stituto.php?id=202&lingua=EN | | | | |
| | Unione nazionale della Accademie | http://www.georgofili.it/home.asp?la | | | | |
| | italiane per la scienze applicate allo | <u>ng=ita</u> | | | | |
| | svillup dell'agricultura, all sicurezza | | | | | |
| | alimentare e all tutela ambientale | | | | | |
| | (UNASA) | | | | | |
| | Nationalcentral library for Italy / Florence | http://www.bncf.firenze.sbn.it/ | | | | |
| | Food and Agriculture Organization of the | http://www.fao.org/library | | | | |
| | United Nations | | | | | |
| | International Fund for Agricultural | http://www.ifad.org/pub/index.htm | | | | |
| | Development (IFAD) | | | | | |
| | CReS | http://www.cresoricerca.it/index.asp | | | | |
| | UnivPM Agraria | http://www.d3a.univpm.it/ | | | | |
| | Dipartimento Colture Arboree University | zie universiteit Bologna | | | | |
| | of Bologna IT-Bologna | | | | | |
| | AGRARIA | http://www.agraria.it/ | | | | |
| | University of Udine Dept. of Scienze | http://www.uniud.it | | | | |
| | agrarie e ambientali IT-Udine | | | | | |
| | Uniser Polo universitario di Pistoia | http://www.uniser-pistoia.com/ | | | | |
| | Confederazione Italiana Agricoltori | http://www.ciatoscana.org/ | | | | |
| | Centro Sperimentale per il Vivaismo | http://www.cespevi.it/ | | | | |
| | ANCP (Catalogo italiano dei periodici) | http://acnp.unibo.it/cgi- | | | | |
| | Contro di Dogumentazione Furenza | ser/start/it/cnr/fp.html | | | | |
| | Centro di Documentazione Europea | http://www.unict.it/en/libraries-and-documentation-centre-cbd-0 | | | | |
| | Catalogo Polo Bolognese | http://sol.unibo.it/SebinaOpac/Sebina | | | | |
| | Catalogo Folo Bolognese | YOU.do#0 | | | | |
| | Informazione Agrario | http://www.informatoreagrario.it/ita/r | | | | |
| | miormazione rigitario | iviste/index.asp | | | | |
| The | VBN | http://www.vbn.nl/nl- | | | | |
| Netherlands | | NL/Pages/default.aspx | | | | |
| Portugal | BISA biblioteca do Instituto Superior de | http://www.isa.utl.pt/bisa/a_bisa_eng | | | | |
| | Agronomia (Univ. Van Lisboa) | lish1.htm | | | | |
| | | http://ulisses.sibul.ul.pt/ulisses/portal | | | | |
| | | /html/index.htm | | | | |
| | Altri florestal | http://www.altri.pt/ambienteesustentab/G | | | | |
| | | estaoflorestal/ | | | | |
| | Universidade de Évora/ICAAM, Dept. de | http://depage.ucyges.pt/rdrs/ | | | | |
| | Engenharia Rural, Núcleo da Mitra, Évora, Pt. RCAAP Repositorio Cienficifo de Acesso | http://dspace.uevora.pt/rdpc/ | | | | |
| | Aberto de Portugal | http://www.rcaap.pt/index.jsp | | | | |
| Spain | Instituto Canario de Investigaciones Agrarias | http://www.icia.es/ | | | | |
| • | IVIA, instituto valenciano, de investigaciones | http://www.ivia.es/ | | | | |
| | agrarias | | | | | |
| | IRTA, Research & Technology, Food & | http://www.irta.cat/en- | | | | |



| Agriculture | us/RIT/Centres/pages/Cabrils.aspx |
|---|--|
| <u> </u> | |
| Fundación Cajamar / Estación Experimental | http://www.fundacioncajamar.es/ |
| de la Fundación Cajamar | |
| IMIDA Instituto Murciano de Investigación y | http://www.imida.es/paginas/index.html |
| Desarrollo Agrario y Alimentario, Consejería | |
| de Agricultura y Agua - Comunidad | |
| Autónoma de la Región de Murcia | |
| InfoAgro | http://www.infoagro.com |
| Departamento de Protección Vegetal, Instituto | http://www.ica.csic.es/ |
| de Ciencias Agrarias - CSIC, C/Serrano 115 | |
| bis, Madrid 28006, Spain. | |
| Universidad de Valladolid, Biblioteca | http://almena.uva.es/ |
| Universidad de Valladolid Uva Biblioteca | http://buva.worldcat.org/advancedsearch |
| Universitaria (worldcat) | |
| Universidad de Almería, Biblioteca | http://bibencore.ual.es/iii/encore/home?la |
| | ng=eng&suite=cobalt&advancedSearch= |
| | true&searchString= |
| Universidad de Lleida, Biblioteca | http://www.sbd.udl.es/ |
| Catálogo BNE (Biblioteca Nacional Espagne) | http://catalogo.bne.es/uhtbin/authoritybro |
| | wse.cgi?lang=en |



Appendix C. Overview of other species of Acacia used or naturalized in the EU.

- A. alpina F. Muell.
- A. baileyana F. Muell.
- A. caven (Molina) Molina
- A. cognata Domin
- A. cultriformis G. Don (Cultivated)
- A. cyclops G. Don (Portugal)
- A. decora Rchb. f.
- A. farnesiana (L.) Willd. (France, Italy, Sicily, Spain)
- A. howittii F. Muell.
- A. karroo Hayne (Corsica, Portugal, Sicily, Spain)
- A. mearnsii De Wild. (Corse, Italy, Portugal, Spain)
- A. neriifolia A. Cunn. Ex. Benth.
- A. paradoxa DC.
- A. pataczekii D.I. Morris
- A. pendula G. Don
- A. podalyriifolia G. Don
- A. pravissima F. Muell. (Cultivated)
- A. pycnantha Bentham (Italy, Portugal, Sardinia)
- A. riceana Hensl.
- A. robusta Burch
- A. rubida A. Cunn.
- A. terminalis (Salisb.) J.F. Macbr (syn. A. botrycephala)
- A. tortilis (Forssk.) Hayne
- A. ulicifolia (Salisb.) Court.
- A. verticillata (L.'Hér.) Wild.
- A. xanthophloea Bent.

Sources: Flora Europaea, European Garden Flora & List of names of woody Plants, RHS Plantfinder, PlantScope, DAISIE, Global Invasive Database, Acta Plantarum.



Appendix D. Distribution data of several Acacia species in different databases.

Acta Plantarum (A), Altervista (V), CABI (C), DAISIE (D), EPPO (E), Global Invasive Species Database (G), Invasoras (I), MAGRAMA (M) and Tela Botanica (T).

| SPECIES | | 1 | | | 1 | | | | | 1 | | | | | | | | |
|------------------------------------|-------|--------|-------|----------|--------|---------|-------|---------|--------|-------------|----------|----------|--------|---------|----|-------|---------|---------|
| or Edico | | | | | | | | | | | | | | | | | | |
| | Italy | Greece | Spain | Portugal | France | Romania | Corse | Madeira | Azores | Canary Isl. | Baleares | Sardinia | Cyprus | Sicilia | ž | Malta | Croatia | Belgium |
| A. alpina F. Muell. | | | | | | | | | | | | | | | | | | |
| A. baileyana F. Muell. | | | D | D | DT | | D | D | | | | | | | | | | |
| A. caven (Molina) Molina | | | С | | | | | | | | | Α | | | | | | |
| A. cognata Domin | | | | | | | | | | | | | | | | | | |
| A. cultriformis G. Don | AV | | | D | DT | | | | | | | V | | | | | | |
| A. cyclops G. Don | AV | | D | DIC | | | | D | D | DC | | | С | V | | С | | |
| A. dealbata Link | DAVEC | | DECM | DIEC | DECT | EC | DC | D | DEC | D | D | DVEC | С | | | | EC | |
| A. decora Rchb. f. | | | | | | | | | | | | | | | | | | |
| A. farnesiana (L.) Willd. | GVC | D | GC | G | GDC | | DT | D | D | D | | D | D | V | | | | |
| A. floribunda (Vent.) Willd. | | | | | | | | | | | | | | | | | | |
| A. howittii F. Muell. | | | | | | | | | | | | | | | | | | |
| A. karroo Hayne | DVC | | DC | DIC | DC | | DT | | | | | DV | D | DVC | | | | |
| A. longifolia (Andrews) Willd. | GDAVC | | GDCM | GDIC | DCT | | DCT | D | D | | D | DV | | | | | | |
| A. mearnsii De Wild. | GAVC | | GDC | GDC | GC | | DCT | DC | | | | DV | | V | | | | |
| A. melanoxylon R. Br. | AVC | | CDGM | DICG | DCGT | | | DI | DIC | | | DVA | | DVA | DC | | | CG |
| A. neriifolia A. Cunn. Ex. Benth. | | | | | | | | D | | | | | | | | | | |
| A. paradoxa DC. | | | | | | | | | | | | | | | | | | |
| A. pataczekii D.I. Morris | | | | | | | | | | | | | | | | | | |
| A. pendula G. Don | | | | | | | | | | | | | | | | | | |
| A. podalyriifolia G. Don | | | | | | | | | | | | | | | | | | |
| A. pravissima F. Muell. | | | | | | | | | | | | | | | | | | |
| A. pycnantha Bentham | DAV | | D | DI | DT | | | D | | | | DV | | | | | | |
| A. retinodes Schlecht. | GDAV | | GD | GDI | GDT | G | DT | | DG | | DG | DVA | G | VA | | | | |
| A. riceana Hensl. | | | | | | | | | | | | | | | | | | |
| A. robusta Burch | | | | | | | | | | | | | | | | | | |
| A. rubida A. Cunn. | | | | | | | | | | | | | | | | | | |
| A. saligna (Labill.) H.L. Wendl. | GDAVC | GD | GDCM | GDIC | GDCT | | DT | - | DI | D | D | DVA | DGC | DVA | | DG | | |
| A. terminalis (Salisb.) J.F. Macbr | | | | | | | | D | | | | | | | | | | |
| A. tortilis (Forssk.) Hayne | | | | | | | | | | | | | | | | | | |
| A. ulicifolia (Salisb.) Court. | | | | | | | | | | | | | | | | | | |
| A. verticillata (L.'Hér.) Wild. | | | D | D | | | | D | | | | | | | | | | |
| A. xanthophloea Bent. | | | | | | | | | | | | | | | | | | |

