

## Juniperus thurifera in Europe: distribution, habitat, usage and threats

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The Spanish juniper (*Juniperus thurifera* L.) is a small coniferous evergreen tree that forms open woodlands on poor soils with Mediterranean continental climate. Its natural range is the western part of the Mediterranean basin, mainly Spain, where is currently colonising new areas due to abandonment of arable lands. The Spanish juniper woodlands are protected habitats by European legislation.

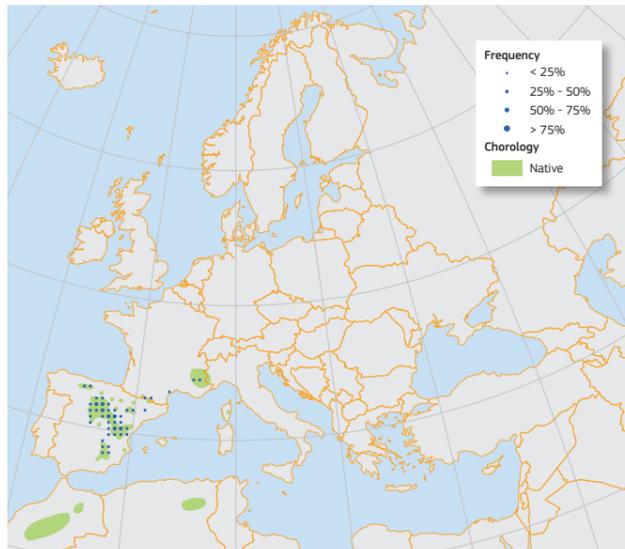
The Spanish juniper (*Juniperus thurifera* L.) is an evergreen coniferous shrub or tree, which can grow up to 20 m<sup>1</sup>, but usually has a height of 5–12 m. The crown is pyramidal in youth and then it becomes broad, rounded, and often irregular. The bark is thin, dark brown, grey-brown at maturity, scaly and exfoliating in strips. Leaves are light green, 2 mm long, acute scaly, appressed, covering completely the twigs. This tree species is **dioecious**. Flowers in male trees are clustered in 3–4 mm yellow spherical cones. Female trees have almost undetectable flowers that ripen into 7–8 mm berry-like dark-purple fleshy cones<sup>2</sup>.

### Distribution

The Spanish juniper is endemic to South-Western Europe and North Africa<sup>3</sup>. European juniper woodlands are mainly in Spain, covering about 600 000 ha<sup>4</sup>, but also occur in French Alps and Pyrenees, in Corsica and the Italian Alps, with a total of 1 500 ha<sup>5</sup>, in Morocco in the High and Middle Atlas mountains, with an area of 20 000 ha, and in Algeria in limited areas of the Aures mountains<sup>6</sup>. In Spain, this species is concentrated mainly in the Eastern part of the Northern Plateau and the Iberian Range, but it found also in the Betic Range, the Ebro River Valley and the Cantabrian Range<sup>7</sup>.

### Habitat and Ecology

Preferred environments are on low to moderate slopes in a semi-arid continental climate, with cold winters and hot summers, from 300 m to above 3000 m of elevation. In Spain it primarily occurs on calcareous soils, but in Morocco it can grow on varied and very rocky soils<sup>4, 7, 8</sup>. At the lowest altitudes, the Spanish juniper is generally associated with the evergreen oak (*Quercus ilex*), while in North Africa it is often associated with the Atlas cedar (*Cedrus atlantica*)<sup>7</sup>. Successful seedling recruitment has been observed in open areas with optimum climate and low grazing pressure, allowing the colonisation of abandoned arable lands in recent decades<sup>4, 9</sup>. However, in mature stands a decreased grazing intensity may favour competing, more palatable and shade-tolerant tree species that benefit from the established juniper cover, triggering succession that decreases local abundance of the Spanish juniper<sup>10</sup>.



Map 1: Plot distribution and simplified chorology map for *Juniperus thurifera*. Frequency of *Juniperus thurifera* occurrences within the field observations as reported by the National Forest Inventories. The chorology of the native spatial range for *J. thurifera* is derived after several sources<sup>16–18</sup>.

### Importance and Usage

The Spanish juniper has been traditionally used as fodder for donkeys and goats, still in use in North Africa, and as firewood. It also used for timber (construction, furniture) and distillation of essential oils<sup>9, 11</sup>. Fleshy seed cones are consumed by a large number of mammal and bird species<sup>12</sup>. The woodlands constitute a singular ecosystem in the western Mediterranean basin, consequently, are listed as protected habitat by European legislation<sup>13</sup>.

### Threats and Diseases

Several fungal diseases may cause dieback of branches, but severe defoliations are usually caused by larvae of the small moth *Gelechia senticetella*<sup>14</sup>. Other insects and the mite *Trisetacus quadrisetus* parasite the seeds and cause extremely low ratios of



Berry-like dark-blue seed cones: they mature over a period of around 18 months. (Copyright Gaston Aitor. CC-BY)

viable seeds<sup>9</sup>. Despite its tolerance to harsh climatic conditions, a large contraction of the Spanish juniper range is expected as a result of climate change<sup>15</sup>. In Morocco heavy grazing and browsing pressures have caused damage and prevented regeneration<sup>5</sup>.

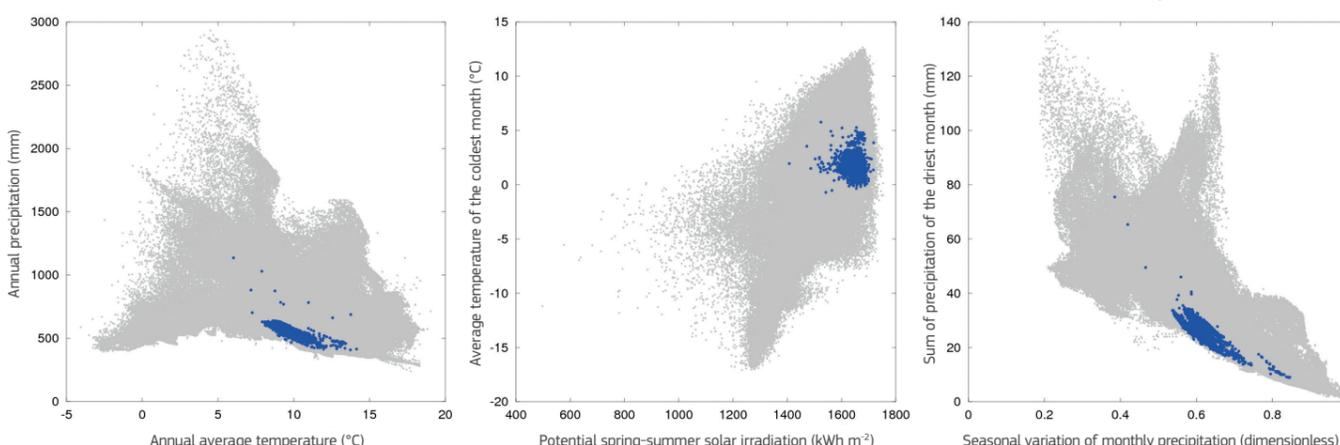


Isolated Spanish juniper with divided trunk at early age. (Copyright Gaston Aitor. CC-BY)



Young Spanish juniper stand developing after agricultural use abandonment and decreasing grazing pressure. (Copyright Gaston Aitor. CC-BY)

### Field data in Europe (including absences) ● Observed presences in Europe ●



### Autecology diagrams based on harmonised field observations from forest plots.

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