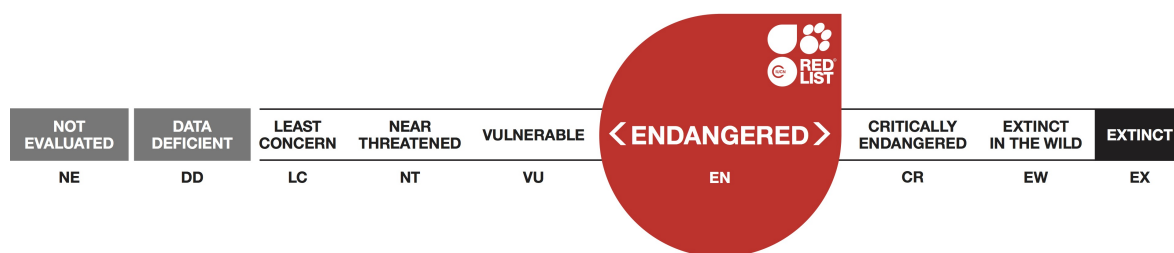


Zannichellia contorta

Assessment by: García Murillo, P.G., Lansdown, R.V., Carapeto, A., Pinto Cruz, C., Ríos Ruiz, S. & Fraga i Arquimbau, P.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Plantae	Tracheophyta	Liliopsida	Alismatales	Potamogetonaceae

Taxon Name: *Zannichellia contorta* (Desf.) Chamisso & Schltldl.

Synonym(s):

- *Potamogeton contortus* Desf.
- *Zannichellia cyclostigma* Clavaud

Regional Assessments:

- Europe

Taxonomic Source(s):

Talavera, S., Garcia Murillo, P. and Smit. H. 1986. Sobre el genero *Zannichellia* L. (Zannichelliaceae). *Lagasalia* 14(2): 241-271.

Taxonomic Notes:

As with some other genera of aquatic plants, the taxonomy of the genus *Zannichellia* is complex and uncertain. Species in this genus have a restricted range of morphological features, and this, together with their plasticity, and the difficulty that some workers have in observing the differences, have resulted in different approaches to the genus. Some authors have recognized only one species (*Zannichellia palustris* L) throughout of the world, but others have recognized different species or several infra-specific categories (Talavera *et al.* 1986, Talavera and Garcia-Murillo 2010).

The approach followed here is primarily based on Talavera and Garcia-Murillo (2010), although presence in southern France is excluded. The first mention of *Z. contorta* in France appears in Talavera's monograph (1986): "SW France ?". However, the authors give no more information, do not cite any French possible exsiccatum, and locate the species only in the center and south of the Peninsula. The justification of this mention is obscure, and it could be just a deduction from its known Iberian area, taking into account a possible overlooking (J.-M. Tison pers. comm. 2018). The whole genus *Zannichellia* was considered as a single polymorphic species before Talavera's monograph.

Assessment Information

Red List Category & Criteria: Endangered B2ab(ii,iii,iv) [ver 3.1](#)

Year Published: 2018

Date Assessed: December 15, 2015

Justification:

This species is native to southern, central and eastern Spain, with an old record from the Atlas Mountains in northern Morocco requiring confirmation. The species is very sensitive to eutrophication and deterioration of water quality. The Area of Occupancy (AOO) has been estimated to be less than 500 km² based on confirmed records and knowledge that its habitat is in continuous decline and at least 40%

of the known localities have disappeared, especially in southern Spain. Moreover, an ongoing continuing decline in AOO, habitat quality and number of subpopulations of this species due to the increase in nutrients concentration from waters of the streams where it lives, which stops its growth, has been observed. The same process of habitat deterioration is happening in central and eastern Spain. The population of this species is severely fragmented with more than half of its subpopulations being isolated with no exchange possibilities and suspected to have reached no viable levels. It therefore qualifies to be listed in the category Endangered (EN B2ab(ii,iii,iv)) in the Mediterranean region. Resource and habitat protection and site management are needed. Other recommended conservation measures are ex situ conservation, population and distribution research, and habitat and population monitoring.

Geographic Range

Range Description:

Whilst some sources (e.g., WCSP 2018) cite a wider distribution (France and Spain, Morocco to Libya) for this species, it is here considered to be endemic to Spain and Morocco. Within Spain, the species is found in central, southern, and eastern parts, where it has been recorded from the provinces of Albacete, Almería, Cádiz, Ciudad Real, Cuenca, Córdoba, Granada, Guadalajara, Jaén, Málaga, Murcia, Sevilla, Toledo, Teruel and Valencia (Talavera and Garcia-Murillo 2010, Castroviejo *et al.* 2012, Anthos 2015). Outside the Mediterranean region, there is a record of this species from Navarra in northern Spain, however it is not likely to be correct (P. García Murillo pers. comm. 2018), based on habitat requirements. Presence in France is given by Talavera and Garcia-Murillo (2010) but rejected by Tison *et al.* (2014) and excluded here.

In Morocco, the species is recorded from the Atlas Mountains in eastern Morocco (Sidi Said, Upper Moulouya; Talavera *et al.* 1986, Fennane *et al.* 1999, Hammada *et al.* 2004), from the Rif Mountains in northern Morocco (Chefchaouen?; P. García Murillo pers. comm. 2018), and from Tangier (Hammada *et al.* 2004). Talavera *et al.* (1986) presented a record from northeastern Algeria (Lambèse, present-day Tazoult), however presence there is considered doubtful (Le Floc'h *et al.* 2010) and the record is excluded here. Similarly, presence in Tunisia and Libya is excluded here.

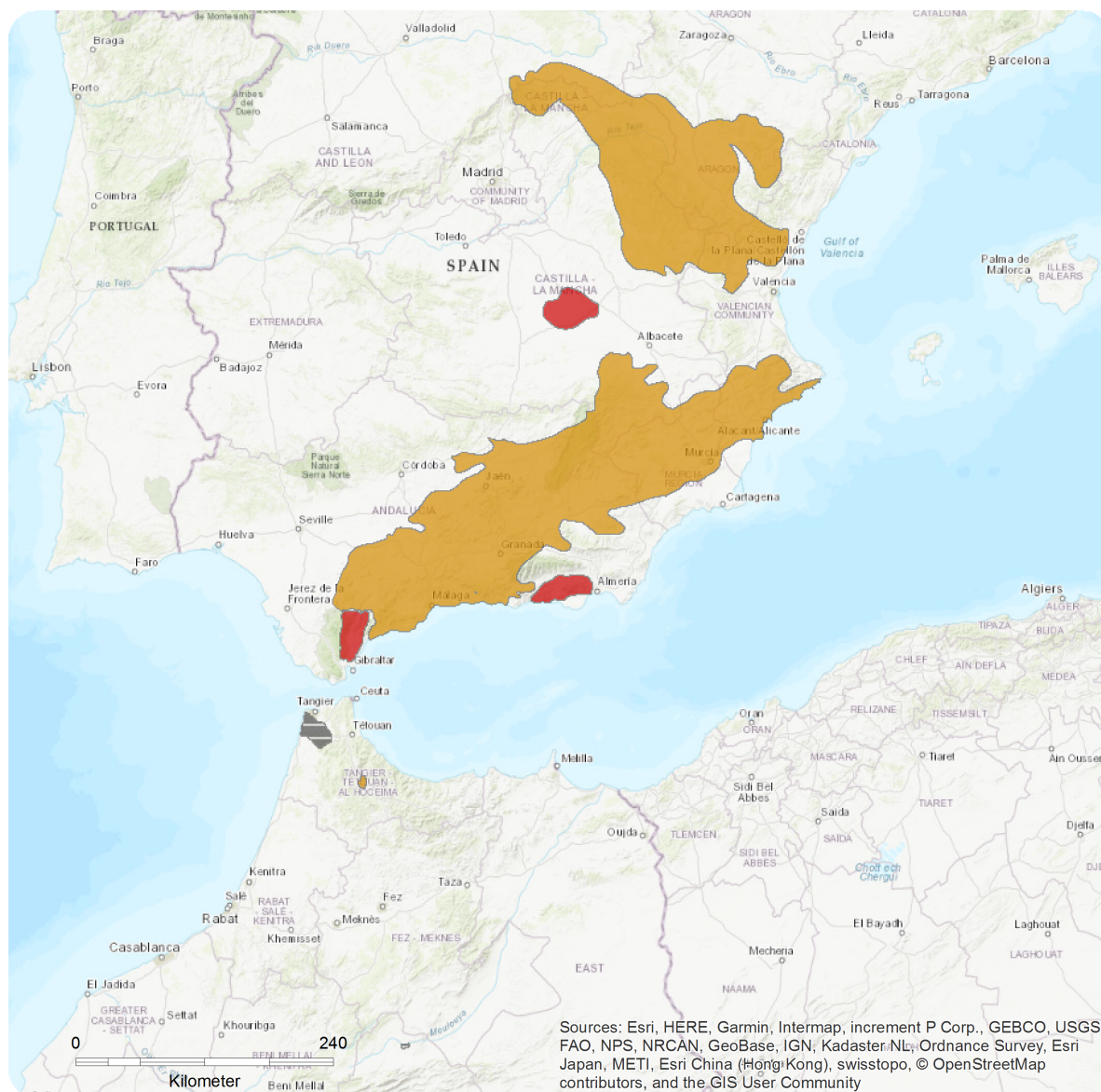
The AOO has been estimated to be less than 500 km² taking into account all the known locality records and excluding the approximately 20 localities from where it is known or expected to have disappeared.

Country Occurrence:

Native: Morocco; Spain (Spain (mainland))

Distribution Map

Zannichellia contorta

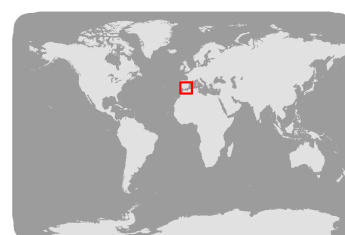


Range

- Extant (resident)
- Extinct
- Presence Uncertain

Compiled by:

IUCN Mediterranean Red List



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



Population

The species has a very localized distribution as a result of its specific habitat requirements. Subpopulations are declining and the species is estimated to have disappeared from 40-50% of the approximately 43 known localities. The narrow ecological requirements of this species, its sensitivity to changes in habitat conditions and the position of this type of habitats, generally in stream valleys separated by mountains, force the plants to live in spots very isolated from each other. Because of this, its population is considered severely fragmented, as more than half of its subpopulations are isolated with no exchange and suspected to have reached no viable levels (P. García Murillo pers. comm 2015). In Morocco, the species is considered very rare (occurring at fewer than five localities; Hammada *et al.* 2004).

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

This species typically grows as submerged dense lawns in permanent waters, usually the headwaters of streams, where the water is clean, rich in carbonates, well oxygenated, with low nutrient concentration and running from craggy streams (Talavera *et al.* 1986).

Systems: Freshwater

Use and Trade

The species is not utilized.

Threats (see Appendix for additional information)

The species is very sensitive to eutrophication and deterioration of water quality or quantity. In the last 30 years, the water quality of streams of running, clean and oxygenated waters where this species lives in Spain have greatly deteriorated through an increase in nutrient concentrations due to activities related to agriculture and cattle raising. Decreased water flows and increased pollution of water bodies as a result of these activities are major threats not only to the southern subpopulations of this species (Cabezudo *et al.* 2005) but also to the central and eastern subpopulations.

Habitat destruction due to the activities of a bottled drinking water company, including water abstraction, chemical conditions alteration of fluent waters through purification processes, and industrial development, has extirpated at least two subpopulations in springs in Murcia and Albacete.

The possibility of increased droughts as a consequence of climatic change is a considerable risk for this species, changing water regimes from permanent to temporary.

Conservation Actions (see Appendix for additional information)

The species is present in several protected areas throughout its range (IUCN and UNEP-WCMC 2017). Habitat protection and control of agricultural and livestock activities causing deterioration of water quality and recuperation of degraded habitats ensuring appropriate water flows is strongly recommended. New water abstraction facilities must be better regulated according to appropriated environmental assessments. The implementation of the water framework directive needs to be

reinforced, especially in the species range. Ex situ conservation through germoplasm banks, additional research on this species distribution, especially in the north of Africa, and population monitoring, are also recommended.

It is listed as Endangered B1ab(iii,iv,v)c(iv)+2ab(iii,iv,v)c(iv) in the National Red List of Spain (Moreno 2008). Some regional Spanish laws protect this species; it is listed as VU in Decreto 33/1998, de 5 de mayo de 1998 of Comunidad de Castilla-La Mancha, in Orden 6/2013, de 25 de marzo of Generalitat Valenciana, and in Decreto 70/2009, de 22 de mayo of Generalitat Valenciana. It is also listed as Vulnerable on the Red List of Andalucía (Cabezudo *et al.* 2005).

Credits

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Citation

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External Resources

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Appendix

Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Habitat	Season	Suitability	Major Importance?
5. Wetlands (inland) -> 5.1. Wetlands (inland) - Permanent Rivers/Streams/Creeks (includes waterfalls)	Resident	Suitable	Yes

Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Threat	Timing	Scope	Severity	Impact Score
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Future	Majority (50-90%)	Slow, significant declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
11. Climate change & severe weather -> 11.2. Droughts	Future	Majority (50-90%)	Rapid declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
2. Agriculture & aquaculture -> 2.3. Livestock farming & ranching -> 2.3.2. Small-holder grazing, ranching or farming	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
2. Agriculture & aquaculture -> 2.3. Livestock farming & ranching -> 2.3.3. Agro-industry grazing, ranching or farming	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
7. Natural system modifications -> 7.2. Dams & water management/use -> 7.2.6. Abstraction of ground water (commercial use)	Ongoing	Unknown	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		

7. Natural system modifications -> 7.3. Other ecosystem modifications	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
9. Pollution -> 9.2. Industrial & military effluents -> 9.2.3. Type Unknown/Unrecorded	Ongoing	Unknown	Unknown	Unknown
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.4. Type Unknown/Unrecorded	Ongoing	Majority (50-90%)	Slow, significant declines	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		

Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions in Place
In-Place Land/Water Protection and Management
Occur in at least one PA: Yes

Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Conservation Actions Needed
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
3. Species management -> 3.4. Ex-situ conservation -> 3.4.2. Genome resource bank

Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

Research Needed
1. Research -> 1.2. Population size, distribution & trends
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km ²): 460
Continuing decline in area of occupancy (AOO): Yes
Estimated extent of occurrence (EOO) (km ²): 145000-150000
Continuing decline in extent of occurrence (EOO): Unknown
Continuing decline in number of locations: Yes
Lower elevation limit (m): 300
Upper elevation limit (m): 1400
Population
Continuing decline of mature individuals: Unknown
Extreme fluctuations: No
Population severely fragmented: Yes
Continuing decline in subpopulations: Yes
Extreme fluctuations in subpopulations: No
All individuals in one subpopulation: No
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes

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