Scientific name	*Eichhornia crassipes*
Common name	Water hyacinth
Broad group	Plant
Number of and countries wherein the species is currently established	5: ES, FR, IT, PT, RO
Risk Assessment Method	EPPO
Links	http://www.eppo.int/QUARANTINE/Pest_Risk_Analysis/PRAdocs_plants/08-14407%20PRA%20record%20Eichhornia%20crassipes%20EICCR.pdf http://www.eppo.int/QUARANTINE/Pest_Risk_Analysis/PRAdocs_plants/08-14408_PRAreport_Eichhornia.pdf
1. Description (Taxonomy, invasion history, distribution range (native and introduced), geographic scope, socio-economic benefits)	Socio-economic benefits: *Eichhornia crassipes* is traded and imported for ornamental purposes (Brunel, 2009).
6. Can broadly assess environmental impact with respect to ecosystem services	*Eichhornia crassipes* may affect provisioning, regulating and cultural services. It interferes with irrigation systems, boating, fishing, etc (Hassan & Ricciardi, 2014).
8. Includes status (threatened or protected) of species or habitat under threat	Whereas in Asia and Africa numerous species are under threat by the dense mats produced by *E. crassipes* http://193.206.192.138/gisd/species.php?sc=70. In the Mediterranean area so far only eutrophic and anthropogenic systems have been affected. Impact on Red List assessed species 21: EX = 1; CR = 4; EN = 3; VU = 5; NT = 4; LC = 4 (from GISD 2014); • *Allotoca diazi CR* • *Aythya innotata CR* • *Aythya nyroca NT* • *Biomphalaria tchadiensis EN* • *Chloropeta gracilirostris VU*

	• *Citharidium ansorgii LC* • *Cyprinus intha EN* • *Dendrocygna bicolor LC* • *Haliaeetus leucoryphus VU* • *Microrasbora rubescens EN* • *Mutela franci VU* • *Ottelia scabra NT* • *Oxyura maccoa NT* • *Pollimyrus petricolus LC* • *Puntius compressiformis CR* • *Rhodonessa caryophyllacea CR* • *Rynchops albicollis VU* • *Steatocranus irvinei NT* • *Tachybaptus pelzelnii VU* • *Tachybaptus rufolavatus EX* • *Villorita cyprinoides LC*
9. Includes possible effects of climate change in the foreseeable future	Risk is likely to increase in the Atlantic area (Kelly *et al.*, 2014). However the main uncertainty relates to the climatic requirements of the species, especially the capacity of the species to be cold tolerant, influencing its ability to establish in more temperate countries, e.g. on the Atlantic coast in France and England. It is not known whether the plant could set seeds during summer in these areas, and whether the crown could survive, protected by dead parts of the plant. Managers in the northeastern United States are concerned that aquatic invasive species such as water hyacinth (*E. crassipes*) will be able to overwinter if temperatures increase, snowfall is reduced, the frequency of freeze–thaw cycles increase or seasonal ice cover melts earlier in the year. Milder winters would not only increase survival but also create longer growing seasons, potentially increasing reproductive output (Hellmann *et al.*, 2008). For example, the geographic distribution of water hyacinth (*E. crassipes*) is currently limited by cold, hard freezes, or ice cover (Grodowitz *et al.*, 1991, Owens & Madsen, 1995); in these areas hand pulling is sufficient control. If warmer winter temperatures allow these plants to overwinter, management will need to be more aggressive, sustained, and expensive (Hellmann *et al.*, 2008). Water hyacinth has invaded freshwater systems in over 50 countries on five continents and, according to recent climate change models, its distribution may expand into higher latitudes as temperatures rise (Rahel & Olden, 2008, Rodriguez‐Gallego *et al.*, 2004). *Eichhornia*

	crassipes is reported to be winter hardy, but sensitive to frost. Frosts kill the leaves and upper petioles which protect the rhizome, but prolonged cold temperatures, below 5 °C, may kill the rhizome resulting in death of the plants (Owens and Madsen, 1995). Kasselmann (1995) reported that its minimum growth temperature is 12 °C, its optimum growth temperature is 25-30 °C, and its maximum growth temperature is 33-35 °C. Optimal growth occurs at temperatures of 28 to 30 °C, while growth ceases when water temperatures drop below 10 °C and it is retarded above 34 °C (Owens & Madsen, 1995).
11. Documents information sources	**Brunel S. 2009.** Pathway analysis: aquatic plants imported in 10 EPPO countries. *EPPO Bulletin* **39:** 201-213. **Grodowitz MJ, Stewart RM, Cofrancesco AF. 1991.** Population dynamics of waterhyacinth and the biological control agent *Neochetina eichhorniae* (Coleoptera: Curculionidae) at a southeast Texas location. *Environmental entomology* **20:** 652-660. **Hassan A, Ricciardi A. 2014.** Are non-native species more likely to become pests? Influence of biogeographic origin on the impacts of freshwater organisms 3. *Frontiers in Ecology and the Environment* **12:** 218-223. **Hellmann JJ, Byers JE, Bierwagen BG, Dukes JS. 2008.** Five potential consequences of climate change for invasive species. *Conservation Biology* **22:** 534-543. **Kelly R, Leach K, Cameron A, Maggs CA, Reid N. 2014.** Combining global climate and regional landscape models to improve prediction of invasion risk. *Diversity and Distributions*. **Owens CS, Madsen J. 1995.** Low temperature limits of waterhyacinth. *Journal of Aquatic Plant Management* **33:** 63-68. **Rahel FJ, Olden JD. 2008.** Assessing the effects of climate change on aquatic invasive species. *Conservation Biology* **22:** 521-533. **Rodriguez-Gallego LR, Mazzeo N, Gorga J, Meerhoff M, Clemente J, Kruk C, Scasso F, Lacerot G, García J, Quintans F. 2004.** The effects of an artificial wetland dominated by free-floating plants on the restoration of a subtropical, hypertrophic lake. *Lakes & Reservoirs: Research & Management* **9:** 203-215.
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Other contributing	Belinda Gallardo

experts	Piero Genovesi
Notes	EPPO DSS: high risk in Mediterranean. Area at risk: Mediterranean and Black Sea regions with some countries within these regions remaining uninvaded. Medium uncertainty for establishment capacity in the Atlantic area.
Outcome	Compliant