Senegal tea (*Gymnocoronis spilanthoides*)

Aquatic weed risk assessment and management

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Introduction

Senegal tea (*Gymnocoronis spilanthoides*)

- Background
  - Biology
  - Native range
  - Introduction and invasion history
- Weed issues and management actions
- Weed risk assessments for *G. spilanthoides*
- EPPO assessment
- What is the weed threat posed by *G. spilanthoides* to North America?

Senegal tea

- Asteraceae
  - Tribe: Eupatorieae
  - Subtribe: Adenostemmatinae
- Three aquatic genera in Eupatoriae
- Two species in *Gymnocoronis*
  - *G. spilanthoides* in S. America centred around Paraguay (7.2 to 36.2°S)
  - *G. latifolia* in Mexico
- Wetland species that can grow submersed

Senegal tea

- Slow moving rivers, reservoirs, irrigation channels, ponds, lakes, canals and ditches
- Eutrophic marshes and swamps
- Summer-green in higher latitudes, but submerged plants tolerant of ice-over
- Seed set variable, 6 to 19% (Vivian-Smith et al. 2005)
- Seed bank >16 years (Panetta 2010)
- Vegetative spread common


TAMRON
TAMRON 90mm
1:2.5

Senegal tea in the ornamental plant trade

- Sold as an aquarium plant and ornamental pond plant in the 1970's (Parsons & Cuthbertson 2001)


Sold as temple plant, spade-leaf plant, giant green hygro, costata
https://nz.pinterest.com/pin/407435097518430673/

Sold as water snowball – promoted as a butterfly plant

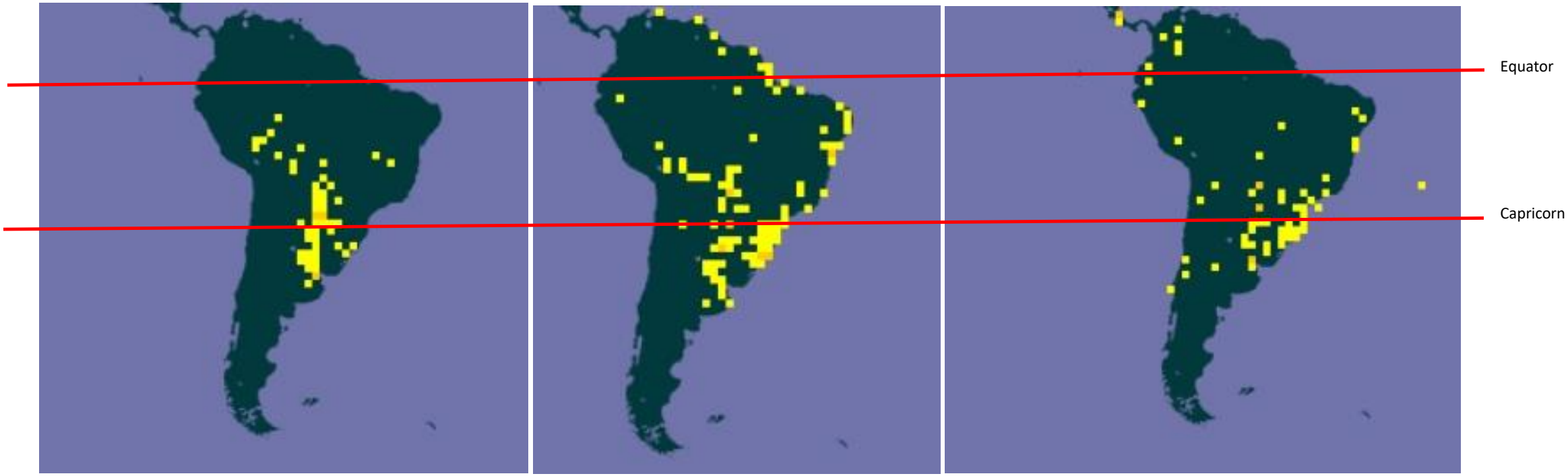
https://butterflygardening.wordpress.com/2009/05/16/gymnocoronis-the-best-pond-plant/

Naturalization history

- Australia 1980 (26.8°S)
- Hungary 1988 – thermally influenced site
- New Zealand 1990
  - Waimakariri River margin in Canterbury (43.4°S)
- Japan 1995
- Taiwan 2001 (22.6°N)
- mainland China 2007
- Italy 2015
  - northwest (45.2°N)
  - hot summers (monthly mean summer ~30°C) and relatively cold winters (monthly mean January <-1°C)

Naturalization history

- Relatively recent introduction history compared with other South American emergent aquatic weeds (e.g., parrotfeather 1890, alligator weed 1902)



Gymnocoronis spilanthoides

Alternanthera philoxeroides

Myriophyllum aquaticum

Weed issues

- Dense, rapidly growing mats of *G. spilanthoides* exclude other biota
- Completely smothers small water bodies, promoting flooding, affecting irrigation and navigation
- Decreases water quality, especially dissolved oxygen, may decline as a result of high plant turnover and decomposition and root respiration

Regulatory status

- Australia
  - Federal Alert List for Environmental Weeds
  - Statutory management in ACT, NSW, Queensland, South Australia, Western Australia, Tasmania and Lord Howe Island
  - Low probability of achieving eradication (Csurhes & Edwards 1998)
- New Zealand
  - National Plant Pest Accord, eradication programmes throughout its New Zealand range (Champion et al. 2014)
- Japan
  - designated Invasive Alien Species (Muranaka et al. 2005)

Weed Risk Assessment

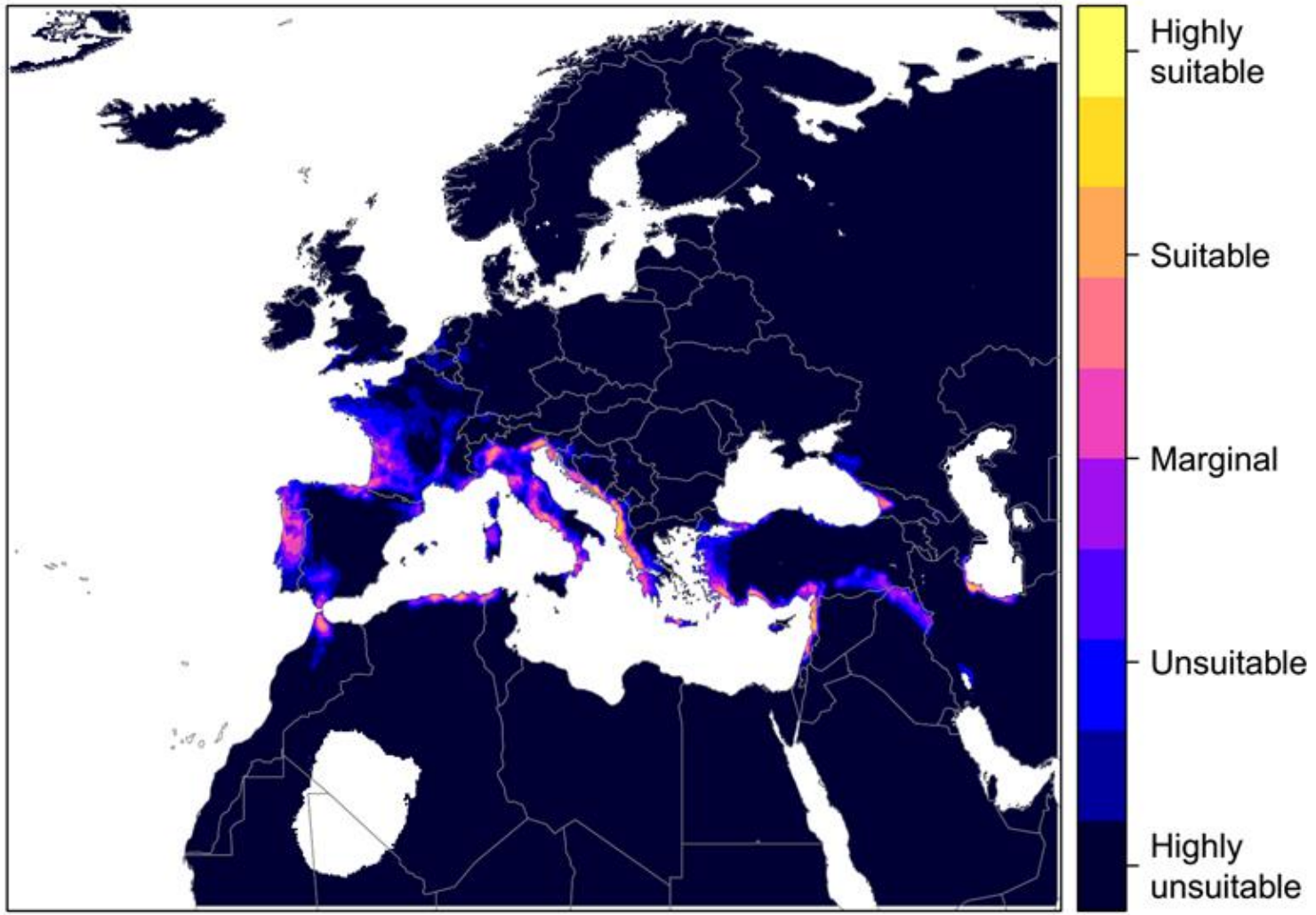
- Australia – highest risk category (Pheloung et al. 1999; Weber & Panetta 2006; Petroeschevsky & Champion 2008)
- New Zealand – in top 12 worst aquatic weeds (Champion & Clayton 2001)
- Europe - EPPO “Alert List” (2009). Horizon Scan for AIS: High probability of establishment, spread and threat to biodiversity (Roy et al. 2015)
- USA – high risk and high probability of invasion (PIER 2009; UDSA APHIS 2012; USDA National Resources Conservation Service 2016)

Burnett et al. (2007) – all growth parameters increased with increasing temperature

EPPO pest risk assessment

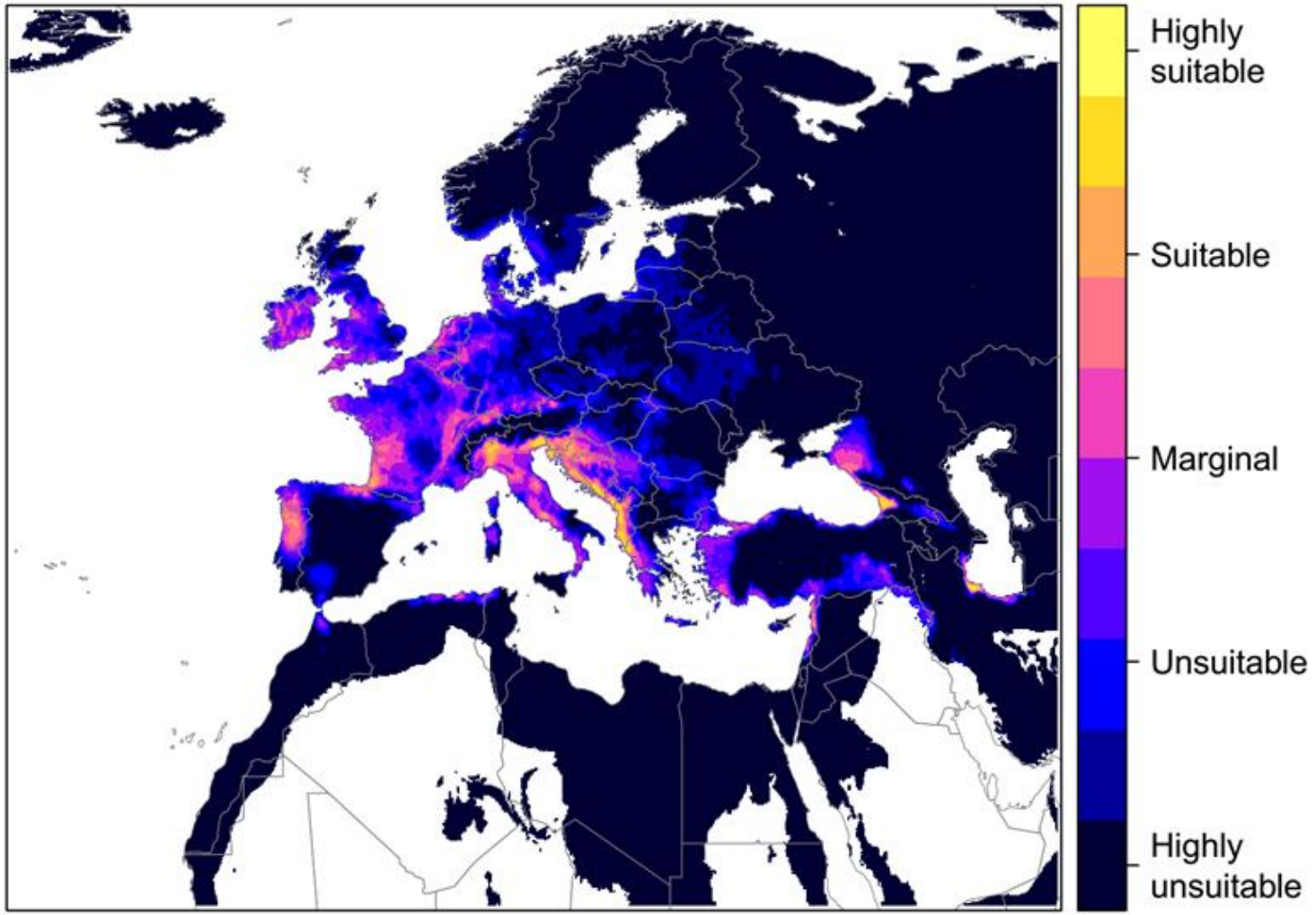
Attribute	Risk	Uncertainty
Likelihood of entry – cultivated spp.	high	low
Likelihood of entry – contaminant	low	low
Likelihood of establishment in the natural environment	high	low
Likelihood of establishment in the managed environment	high	low
Magnitude of spread	moderate	moderate
Magnitude of impact	high	high

EPPO pest risk assessment



Projected current suitability for *G. spilanthoides* establishment in Europe and the Mediterranean region

EPPO pest risk assessment



Projected current suitability for *G. spilanthoides* establishment in Europe and the Mediterranean region in the 2070s under climate change scenario RCP8.5

EPPO pest risk assessment

Draft recommendations:

- *Gymnocoronis spilanthoides* poses an unacceptable risk to the countries bordering the Adriatic Sea and the Eastern Mediterranean as well as parts of Morocco and Algeria, with a high uncertainty
- Ban importation, sale and distribution
- Increase surveillance in high-risk areas
- Eradicate all known populations within the EPPO region

What is the weed threat posed by *G. spilanthoides* to North America?

- Three independent weed risk assessments have predicted high risk and high probability of invasion (PIER 2009; UDSA APHIS 2012; USDA National Resources Conservation Service 2016)
- Based on three climatic variables, 23% of the United States is estimated as suitable for the establishment of *G. spilanthoides* (APHIS 2012)
- *Gymnocoronis spilanthoides* is not on the Federal or any State Noxious Weed list (USDA National Resources Conservation Service 2016)

What is the weed threat posed by *G. spilanthoides* to North America?

- High uncertainty associated with EPPO assessment

- While the species has aggressively invaded some areas there are some discrepancies
- This species has failed to establish in climatically suitable habitats in the USA and South East Asia despite its presence in the trade
- Due to early stage of naturalization, the climatic niche of *G. spilanthoides* may be under-characterized so modelling is likely to give an underestimate of the potential range

- Based on the high costs of control for similar aquatic emergent weeds, early pre-emptive actions would provide high benefit

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