First systematic assessment of germination requirements in the endemic quillwort *Isoëtes malinverniana*

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5MPCW CY-2025

Isoëtes malinverniana Ces. & De Not.

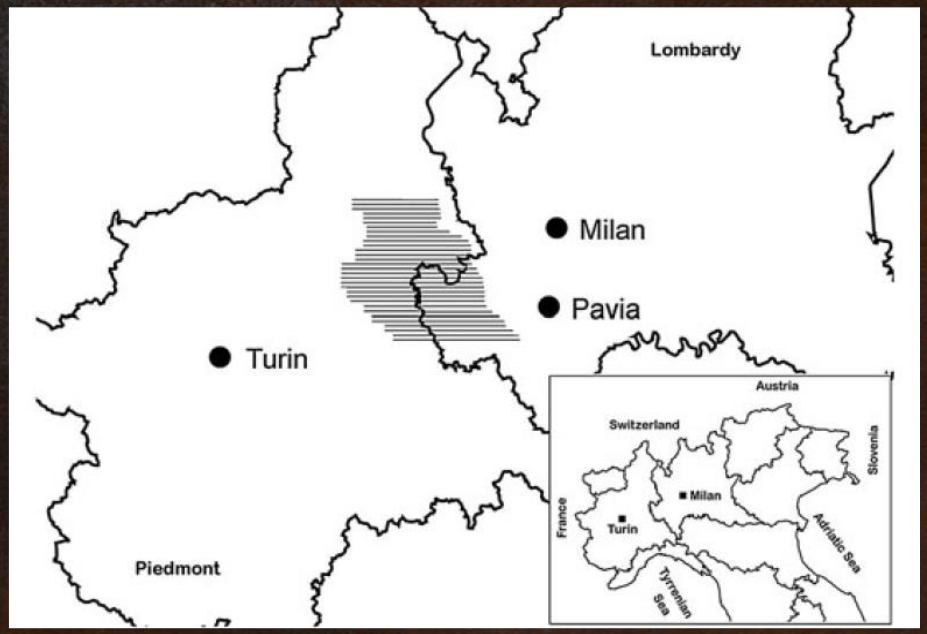
ISOËTES MALINVERNIANA

Aquatic quillwort endemic to Lombardy and Piedmont (N-Italy).

Listed as Critically Endangered (CR) in the IUCN Red List.

15 declining populations.

Main threats are water eutrophication and channel management (mechanical reshaping).



Isoëtes malinverniana Ces. & De Not.

ISOËTES MALINVERNIANA

AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS
Aquatic Conserv: Mar. Freshw. Ecosyst. 22: 66–73 (2012)
Published online 13 January 2012 in Wiley Online Library
(wileyonlinelibrary.com). DOI: 10.1002/aqc.1246

A cost-effective model for preliminary site evaluation for the reintroduction of a threatened quillwort

Aquatic Botany 93 (2010) 147–152
Contents lists available at ScienceDirect
Aquatic Botany
journal homepage: www.elsevier.com/locate/aquabot

Population structure and genetic diversity of the threatened quillwort *Isoëtes malinverniana* and implication for conservation

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Notes on the Natural History and Reproductive Biology of *Isoëtes malinverniana*

Author(s): Thomas Abeli and Marco Mucciarelli
Source: American Fern Journal, 100(4):235-237. 2010.

Hydrochemical Characterization of A Stand of the Threatened Endemic *Isoëtes malinverniana*

Author(s): T. Abeli , S. Orsenigo , N. M. G. Ardenghi E.C.H.E.T. Lucassen and A.J.P. Smolders
Source: American Fern Journal, 103(4):241-244. 2014.

Aquatic Botany 107 (2013) 39–46
Contents lists available at SciVerse ScienceDirect
Aquatic Botany
journal homepage: www.elsevier.com/locate/aquabot

Estimating influence of environmental quality and management of channels on survival of a threatened endemic quillwort

Elena Barni[a,*], Chiara Minuzzo[a], Francesca Gatto[a], Michele Lonati[b], Thomas Abeli[c], Cecilia Amosso[c], Graziano Rossi[c], Consolata Siniscalco[a]

SPECIAL ISSUE ARTICLE
WILEY

The ecology of the endemic quillwort *Isoëtes malinverniana*: From basic research to legal and in situ conservation

Thomas Abeli[1] | Cecilio F. Caldeira[2] | Elena Barni[3] | Consolata Siniscalco[3] | Valentina Parco[4] | Graziano Rossi[5]

ISOËTES MALINVERNIANA

Reproductive biology partially known:

- Spores dispersed in autumn/winter
- Suspected self-compatibility

Female (left) and male (right) sporangia

METHODS

Four tests:

1) Thermal requirements for macrospore germination and sporophyte emergence

2) Macrospore germination and sporophyte emergence in the dark

3) Self-compatibility

4) Apomixis

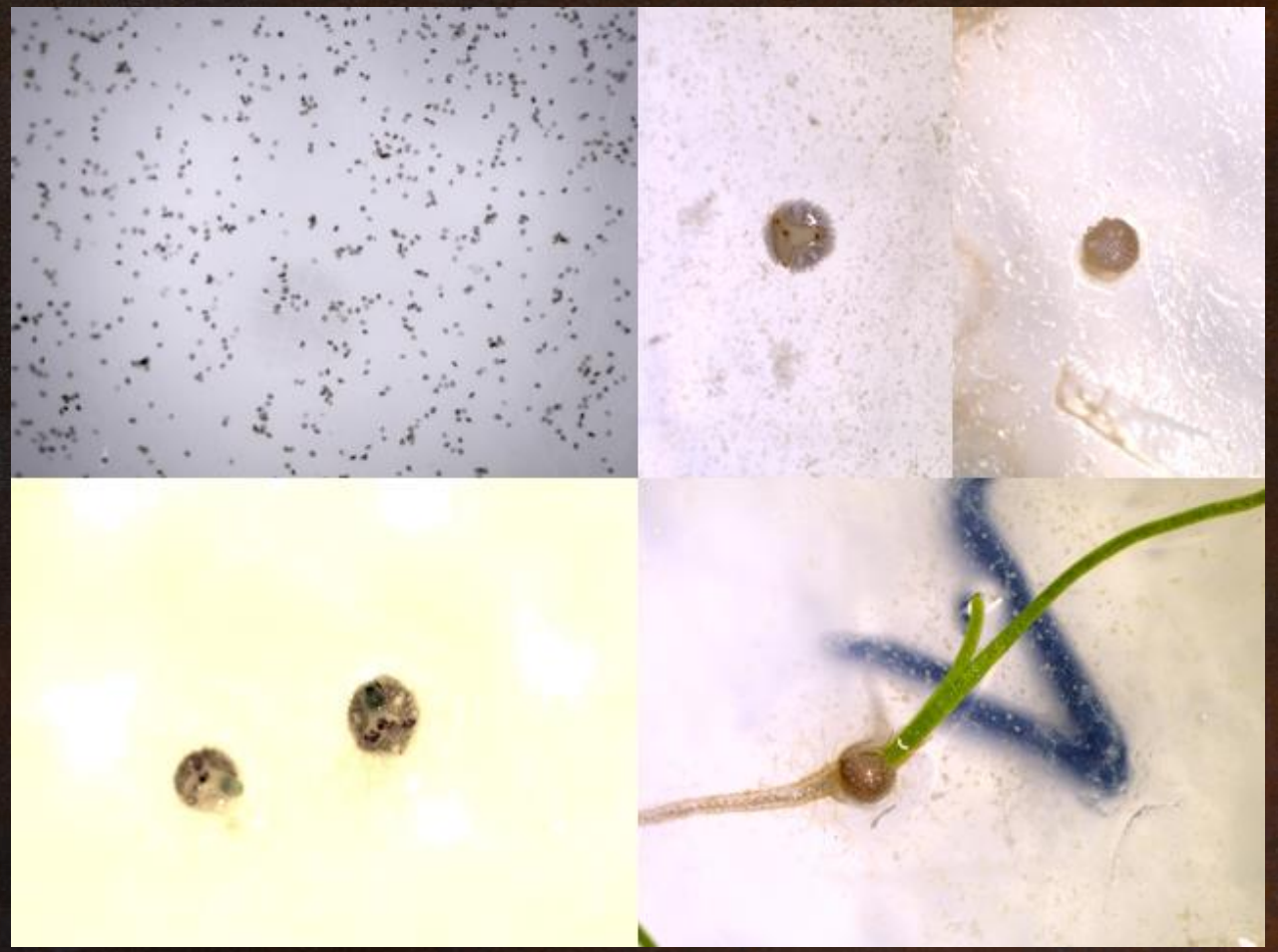


Photo credits: Alessandro Abeli - 6 years old

METHODS

Four tests:

1) Thermal requirements for macrospore germination and sporophyte emergence

2) Macrospore germination and sporophyte emergence in the dark

3) Self-compatibility

4) Apomixis

I. durieui – Source: Dryades - © Domenico Puntillo

METHODS

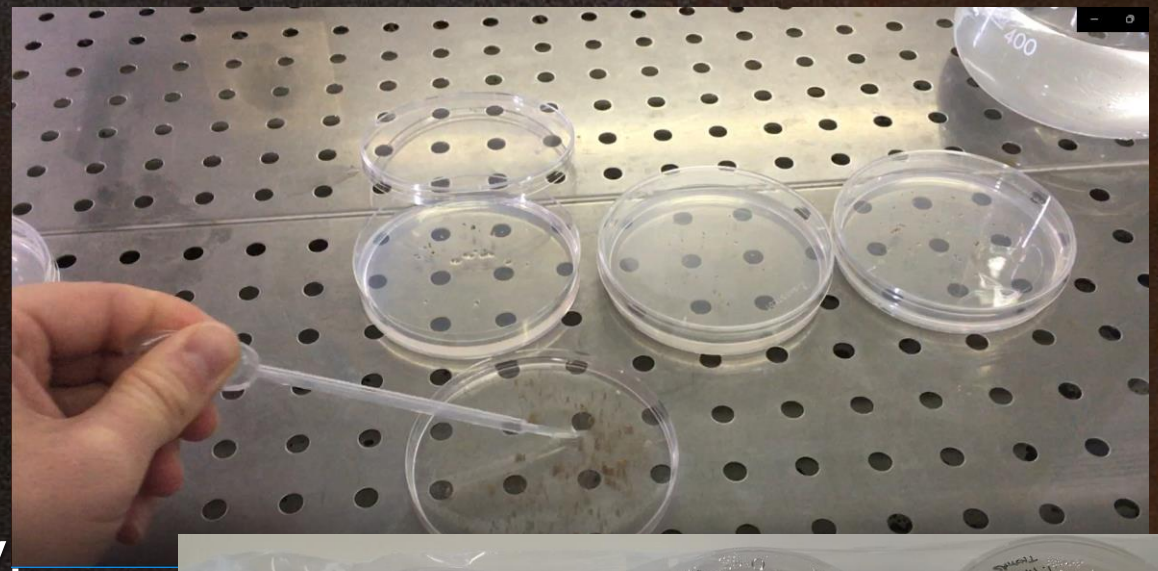
- Spores sown on petri dishes;

- Substrate 1% Agar;

- 3 replicates of 15 spores each;

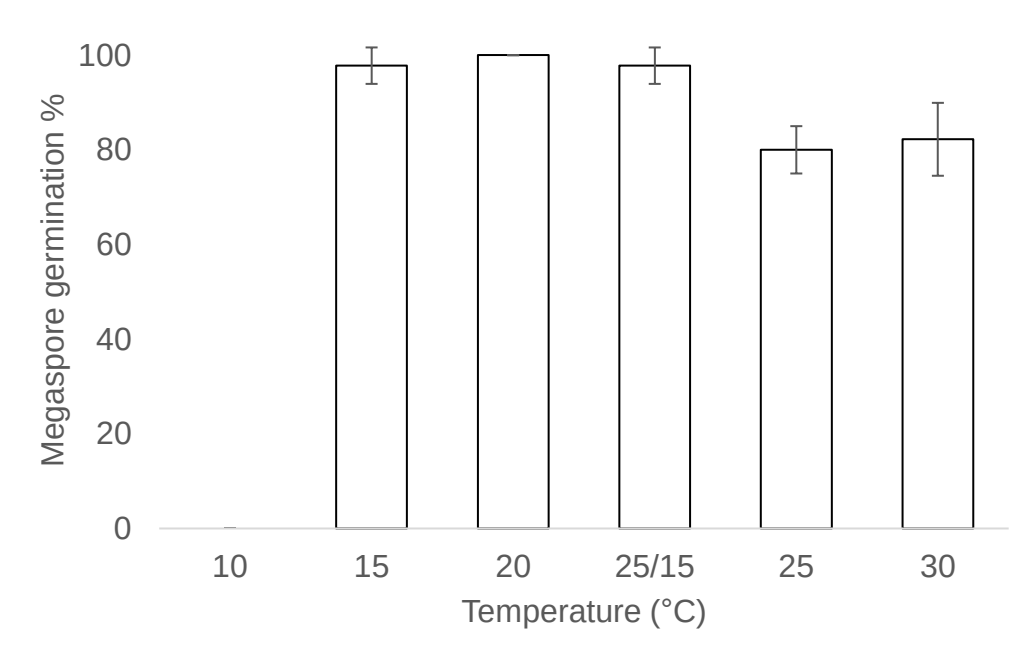
- Germination/Emergence scored weekly;

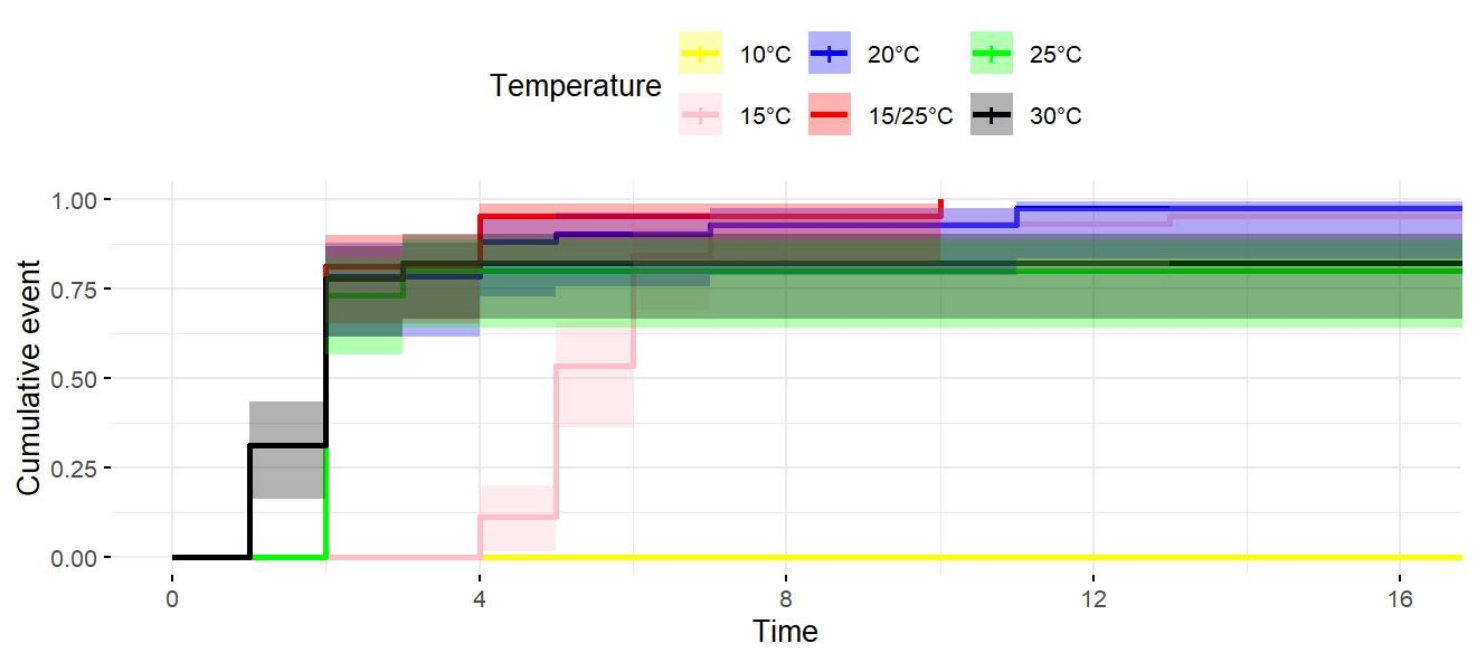
- Incubation in light- and T-controlled incubators.



THERMAL REQUIREMENTS: MACROSPORES

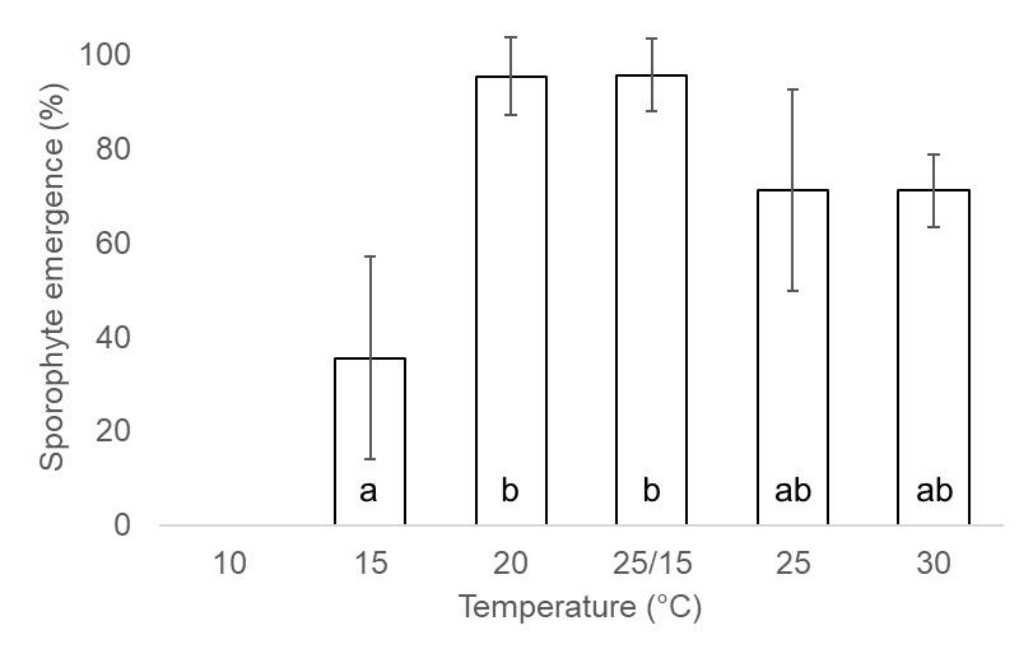
Higher temperatures promote fast megaspore germination.

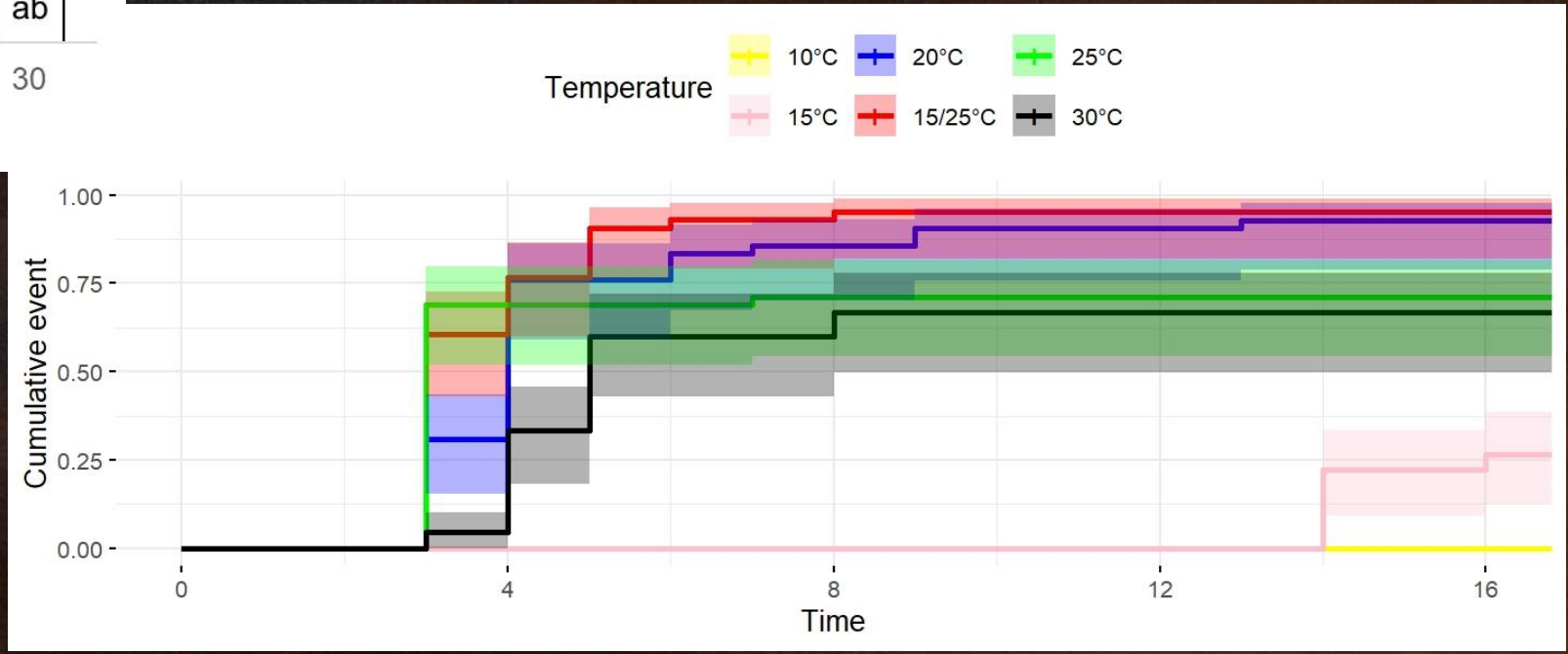




THERMAL REQUIREMENTS: SPOROPHYTES

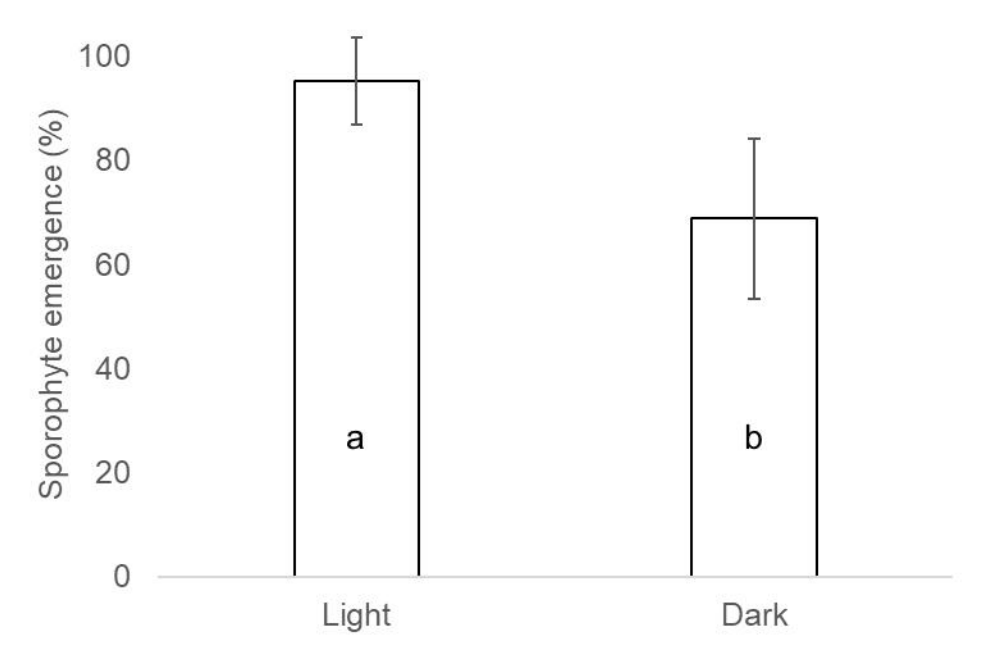
Highest sporophyte emergence at 20°C and 25/15°C.

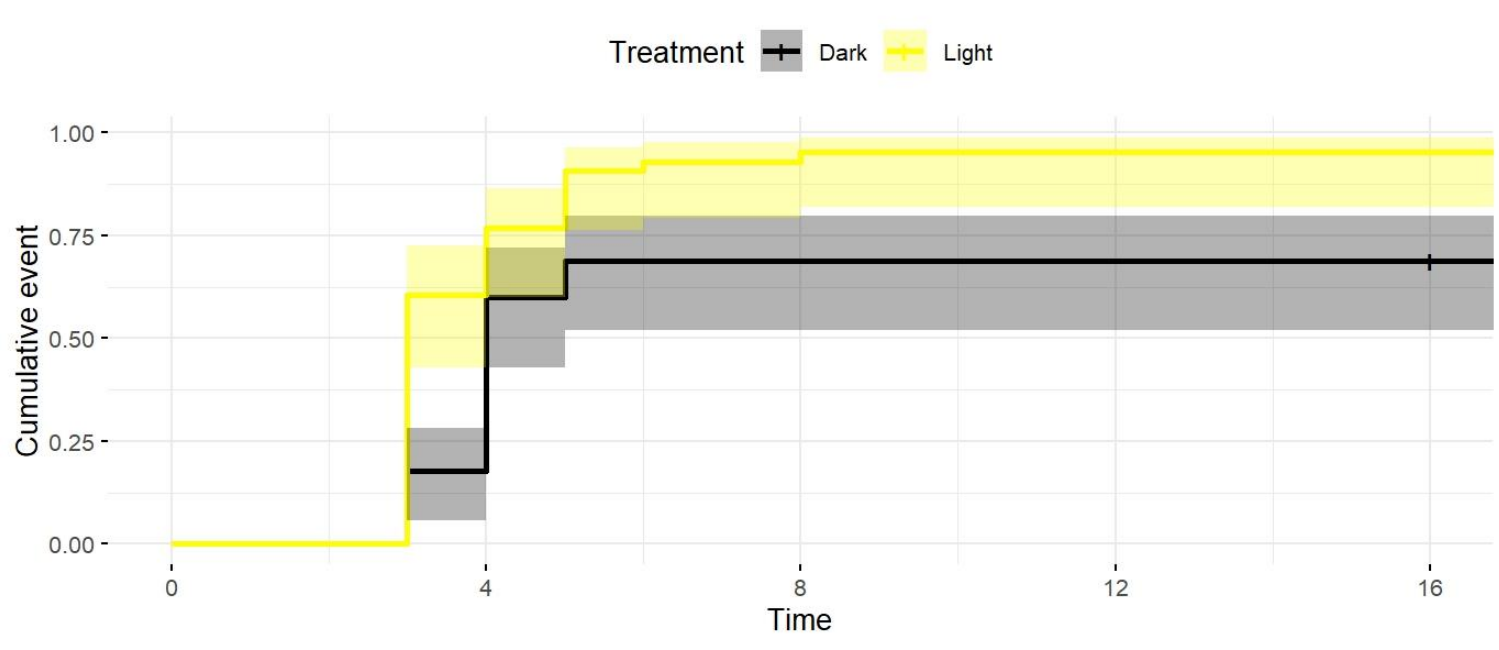




DARK AND LIGHT

Sporophytes can emerge in the dark.





SELF-COMPATIBILITY AND APOMIXIS

I. malinverniana is self-compatible.

In the apomixis test, megaspores germination was not followed by sporophytes emergence.

I. malinverniana lacks the capacity of apomictic reproduction.

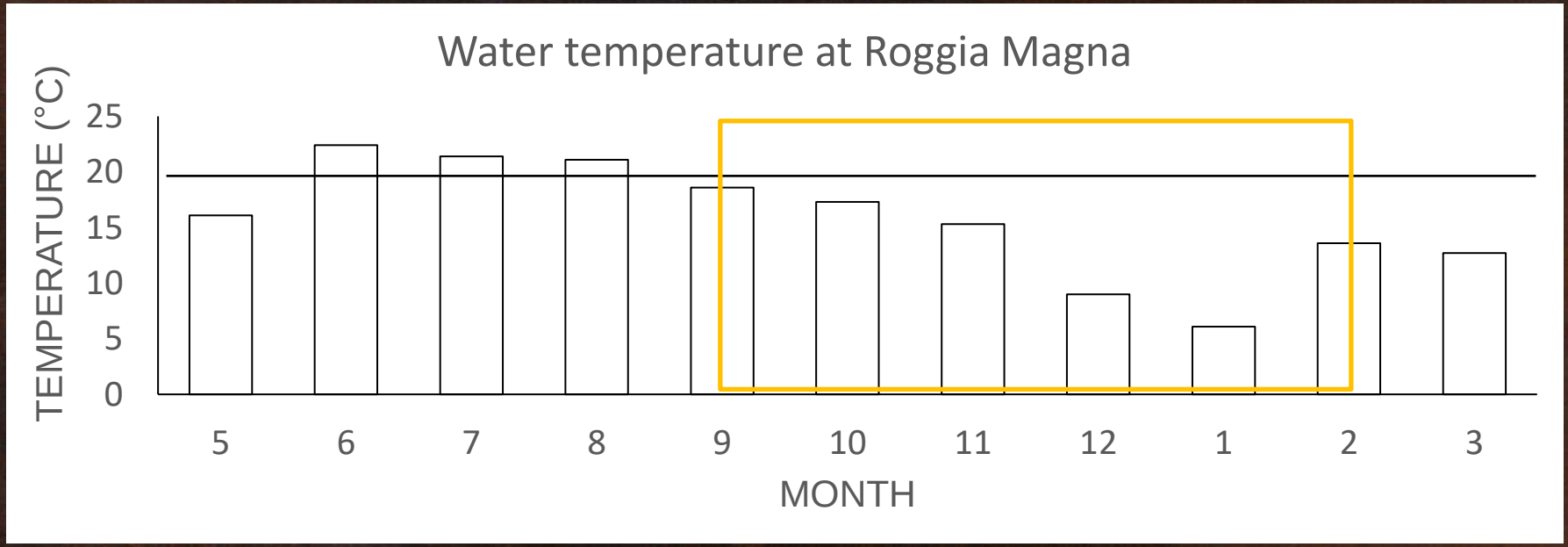
Isoëtes malinverniana Ces. & De Not.

CONCLUSIONS

Germination and sporophyte emergence higher and faster at 20-25°C like in *I. coreana*, *I. cangae, I. lithophila*.

Long time-lag between spore dispersal and suitable germination conditions.

More studies on other species are needed.



This research is the result of lab. practical activities of the course “Reintroduction of rare and threatened plant species“,
Master‘s Course in Biodiversity conservation, science education and communication,
University of Pavia

Students that particpated to the research: Bacchetta Alice, Basilico Flavio, Berardo Pietro, Colli Alice, Colonna Ginevra, Maresca Veronica, Pastor Bini Alessandra Balbina, Pighin Francesca Ida, Ruzzoli Alessia, Tucci Martina, Vesconi Giovanna Angela, Vitaloni Diana, Tarascio Martina

THANK YOU