

Mystisk sjukdom hos sjögull?

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Department of Aquatic Sciences
& Assessment



Mysterious disease in fringed water lily (sjögull)?

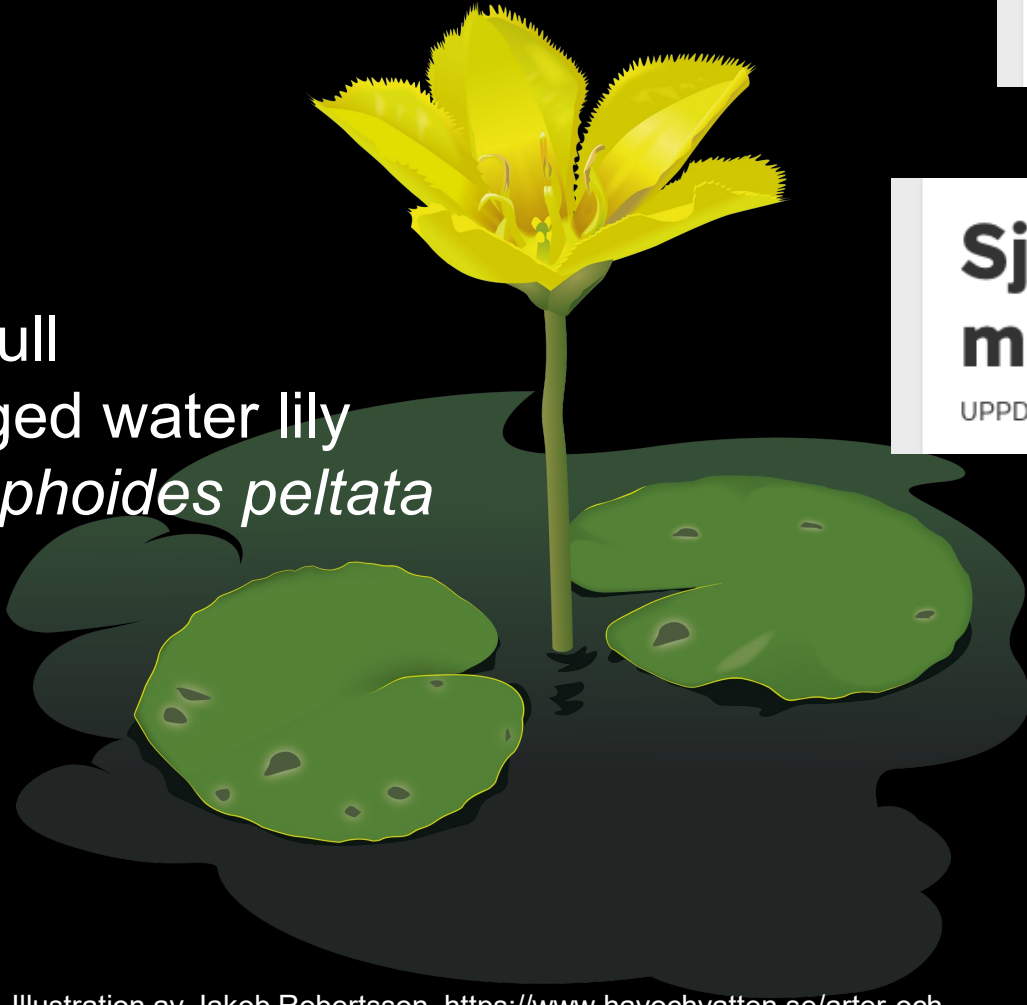
Jennifer Anderson
Ingrid Hägermark
Carina Tennfors
Kristen Reed
Fredrik Lorichs
Stina Drakare
Joel Segersten
Lina Tomasson





Sjögull
Fringed water lily
Nymphoides peltata

Sjögull
Fringed water lily
Nymphoides peltata



**Massdöd av invasiva arten
sjögull i Mälaren – här flyter den
i väg: "Flera fotbollsplaner"**

PUBLICERAD 8 AUGUSTI 2023

SVT

**Sjukdom kan ligga bakom
massdöd av sjögull i Mälaren**

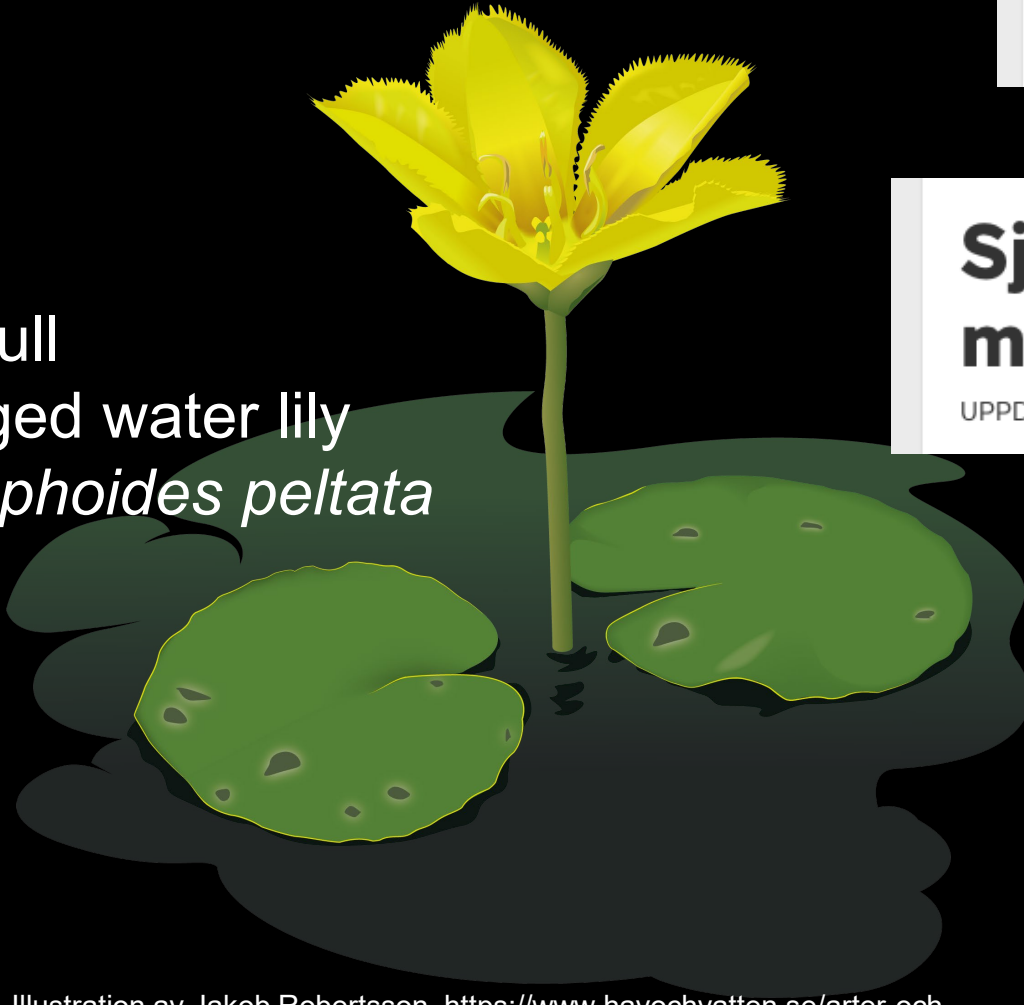
UPPDATERAD 1 SEPTEMBER 2023 PUBLICERAD 31 AUGUSTI 2023

SVT

“Död sjögull är bra sjögull, så vi är glada...”

Zsombor Károlyi, naturvårdshandläggare på
Länsstyrelsen i Västmanland

Sjögull
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“Död sjögull är bra sjögull, så vi är glada, men vi får vara lite försiktiga med att dra slutsatser utifrån enstaka observationer”

Zsombor Károlyi, naturvårdshandläggare på Länsstyrelsen i Västmanland

Sjögull
Fringed Water Lily
Nymphoides peltata



Dead Fringed Water Lily is good
Fringed Water Lily, but....

What has happened?

How important is it?

What has caused it?

What does it mean for next year(s)?

What do we do now?

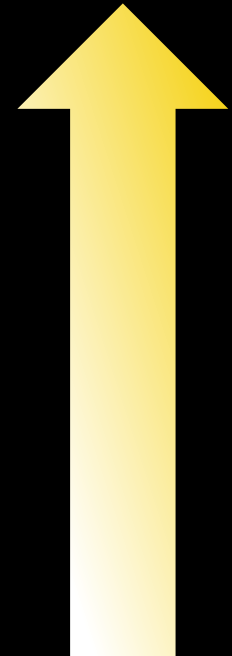


Since the 1930s

Geographic distribution
Number of populations

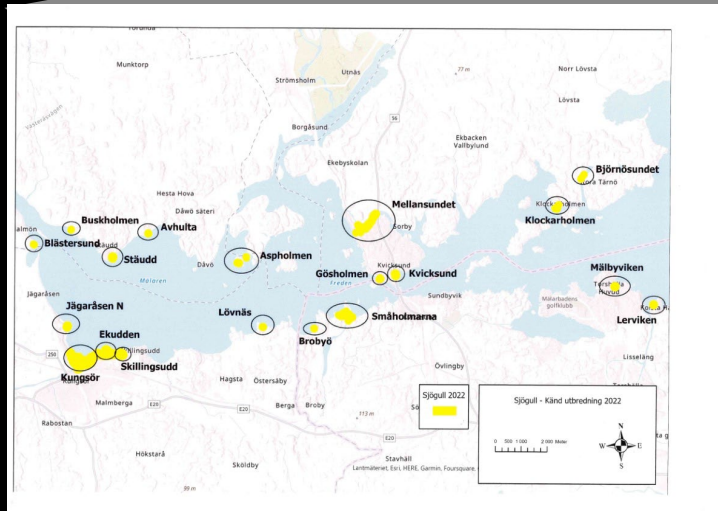
Ecological impact

Money, hours & efforts
to fight the invasion



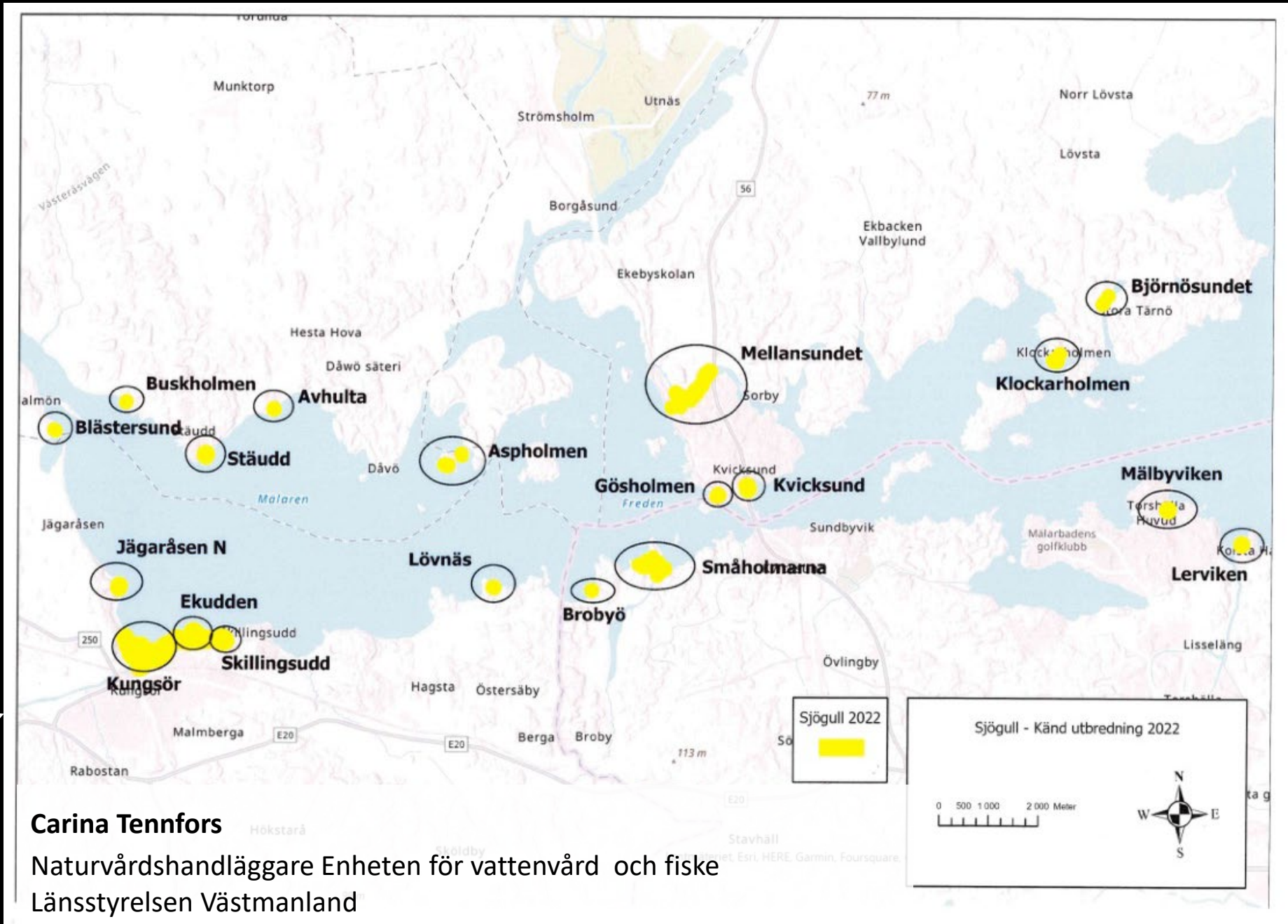
1930s

Arbogaån into lake Mälaren



~19 sites in 2022

Arbogaån



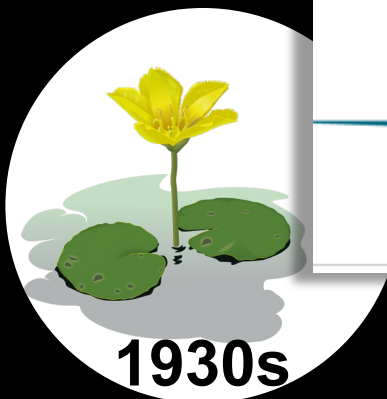
Carina Tennfors

Naturvårdshandläggare Enheten för vattenvård och fiske
Länsstyrelsen Västmanland

Befintlig sjögull

Sjögull i kvm, inventering 2020 och 2022

	2022	2020	Bekämpad yta
Kungsör	77 328	68 417	
Eskilstuna	17 506	15 629	
Västerås	14 538	9 275	
Köping	1 819	629	
Summa	111 191	93 950	16 798
FIFA football pitches	15.5	13	2.4



1930s

Arbogaån into lake Mälaren

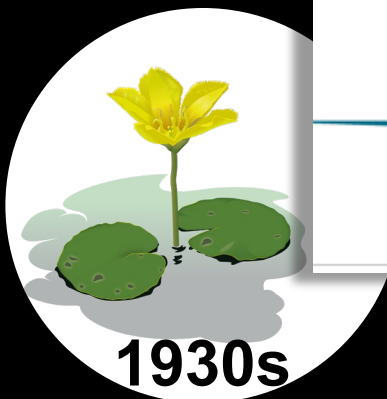
FIFA football pitch = 7140 kvm (m²)

Befintlig sjögull



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1930s

Arbogaån into lake Mälaren

FIFA football pitch = 7140 kvm (m²)

Ingrid Hägermark
Next presentation...



Treatment area
here ~1/3 of a
football pitch

Photo Fredrik Lorichs
Kungsörs kommun

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Timeline and observations

What has happened?



May
Plant
emerges

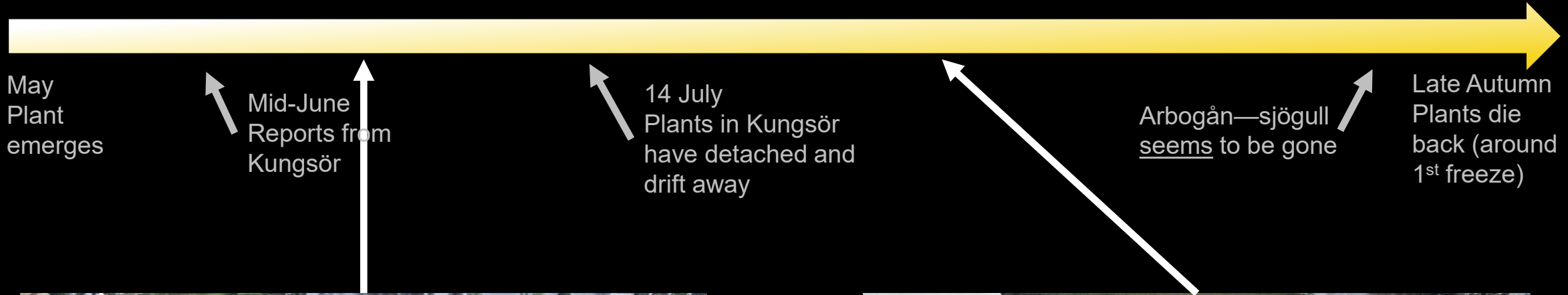
Late Autumn
Plants die
back (around
1st freeze)

Timeline and observations

What has happened?



Reports began before the unusual heavy rains in July





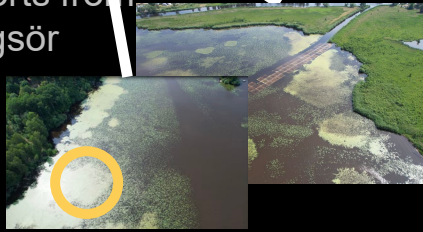
Timeline and observations

What has happened?

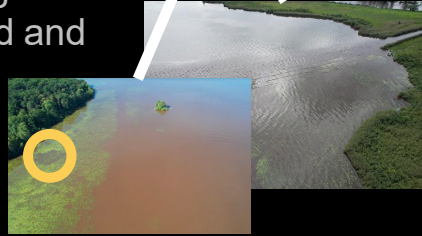


May
Plant
emerges

Mid-June
Reports from
Kungsör



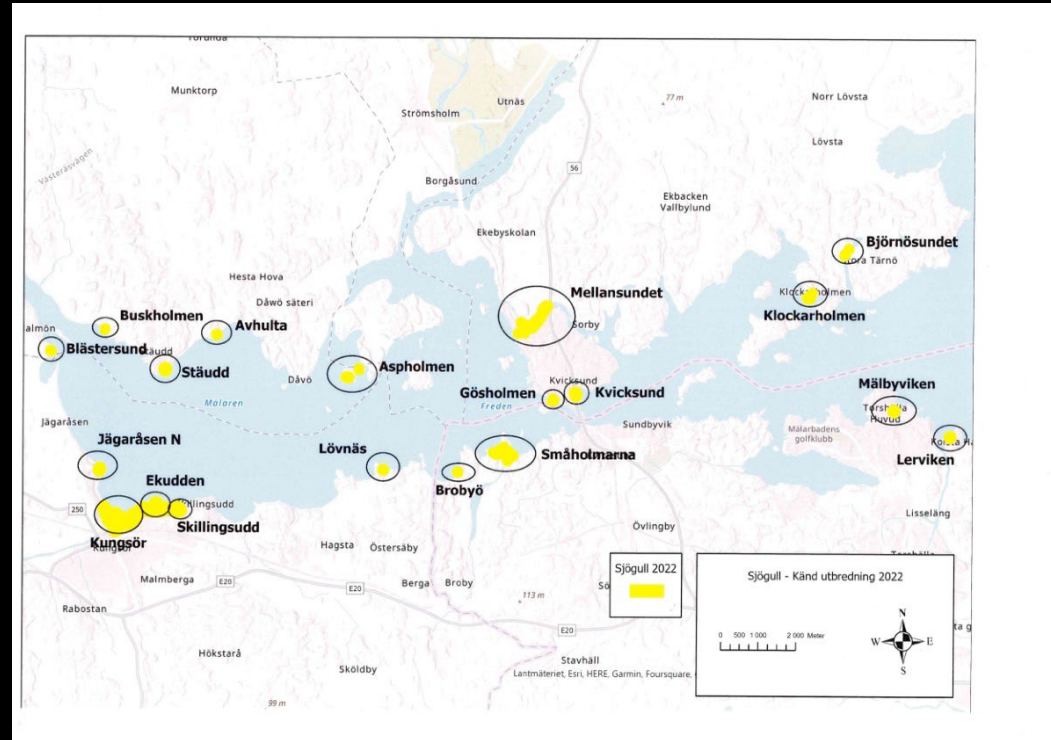
14 July
Plants in Kungsör
have detached and
drift away



Arbogån—sjögull
seems to be gone

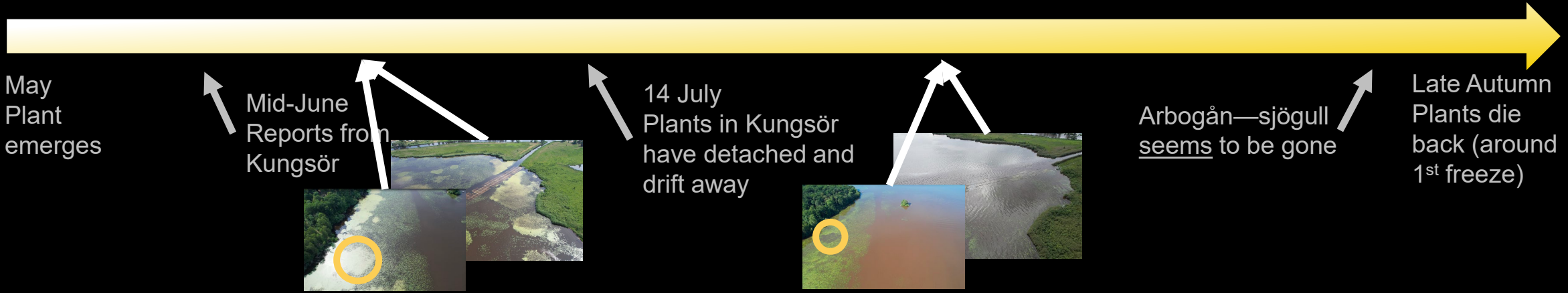
Late Autumn
Plants die
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1st freeze)

West to East



Timeline and observations

What has happened?



West to East



Shore

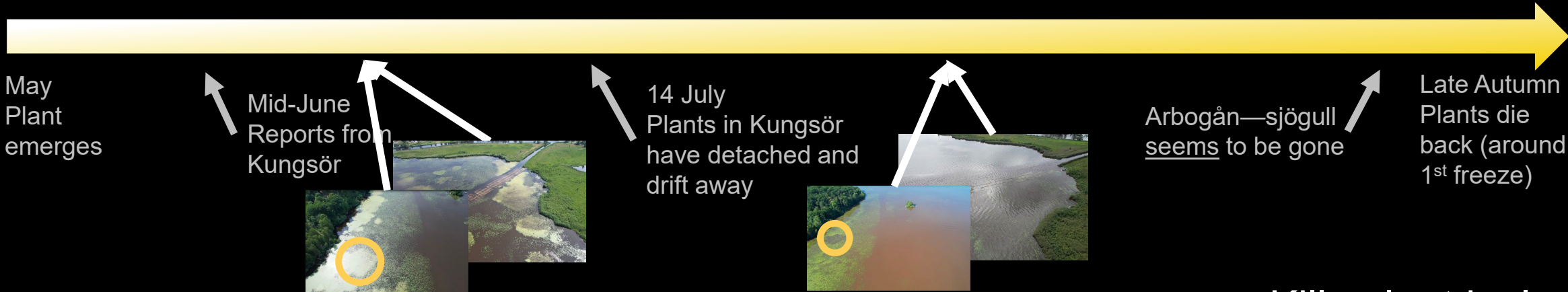


Deeper water



Timeline and observations

What has happened?



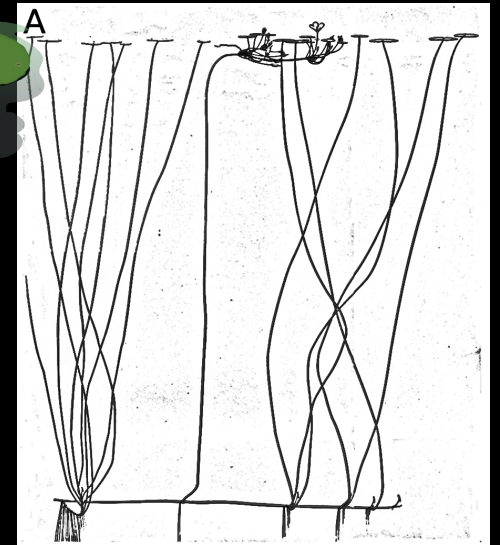
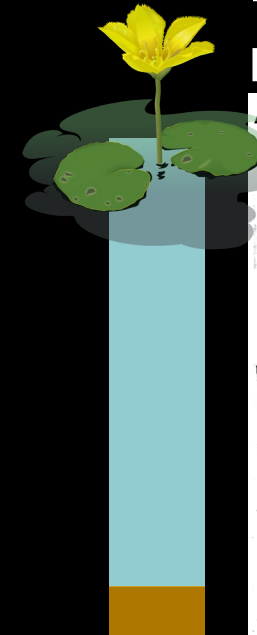
West to East



Shore



Kills plant incl. rhizome



Is this a fungus at work?

What is the cause?



Foto: David Kvarnsudde
Örebro. 28 Augusti

Foto: Carina Tennfors
Augusti





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Augusti

Fungal pathogens reported from
N. peltata (sjögull)

- *Puccinia scirpi*
- *Uromyces nymphoidis*
- *Septoria villarsiae*



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<https://doi.org/10.5423/PPJ.2010.26.2.203>

Septoria villarsiae?

Foto: David Kvarnsudde
Örebro. 28 Augusti



Leaf from Mälaren

Is this a fungus at work?

What is the cause?

Leaf known to have *S. villarsiae* and fungus growing in lab



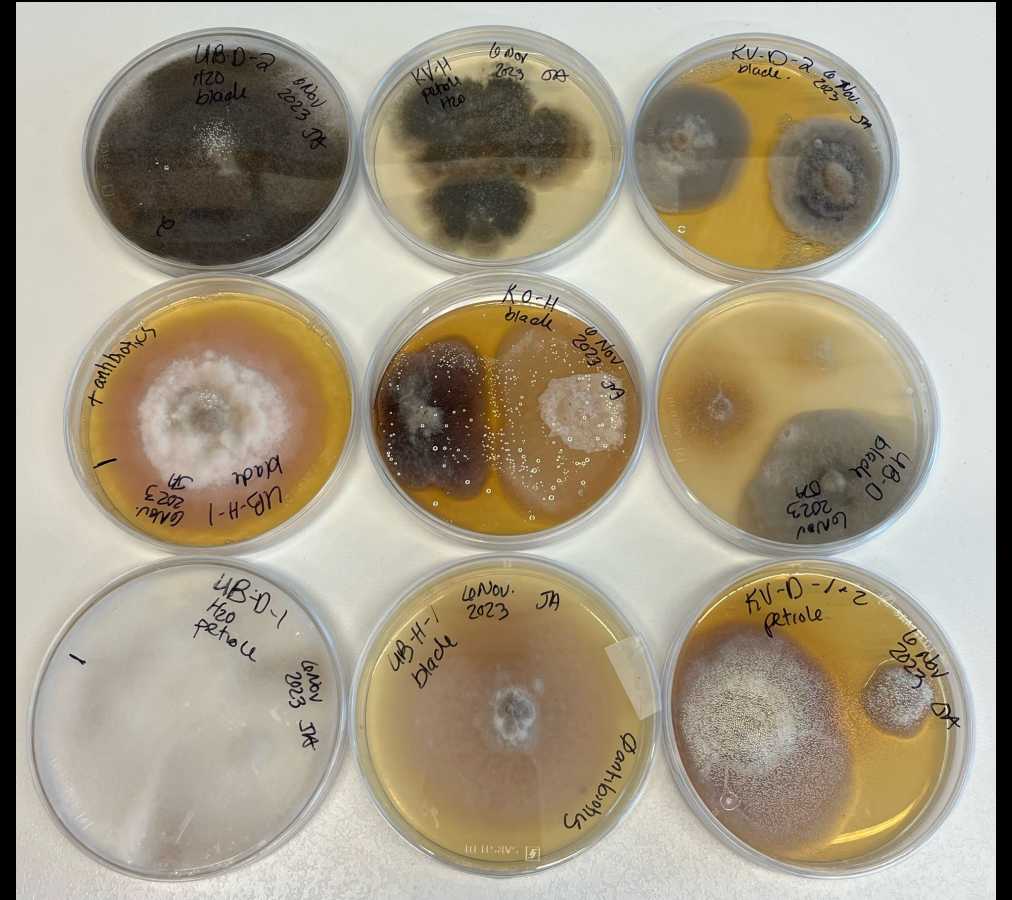
Septoria villarsiae?

- *Septoria villarsiae* is a strong suspect

Reported in Europe, unknown for Sweden

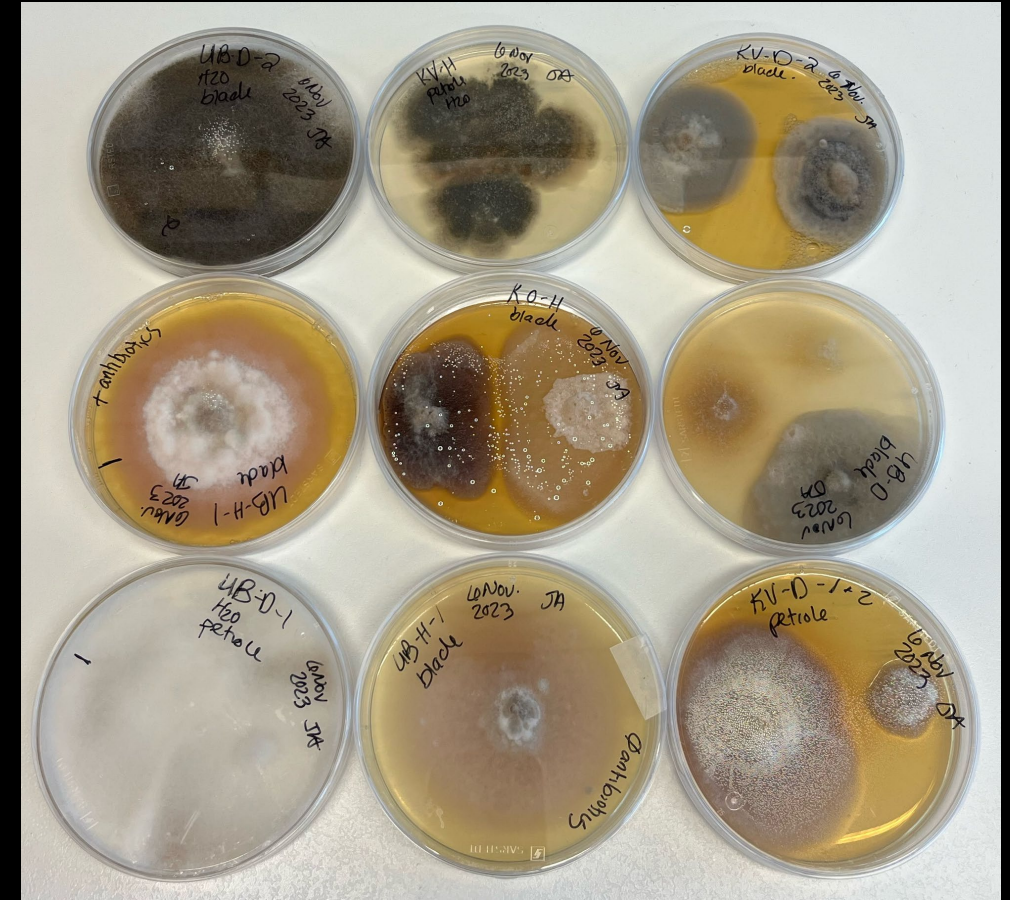
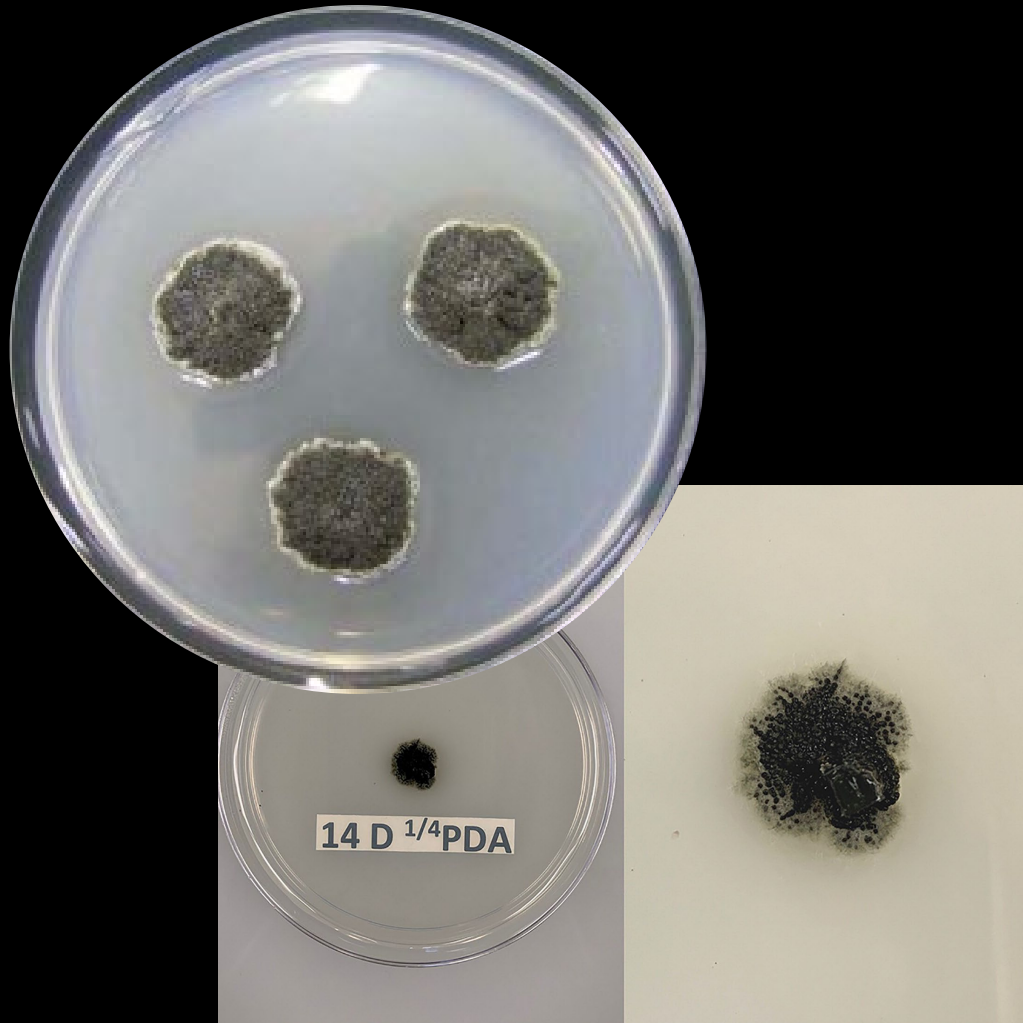
Known to cause plant death

Is this a fungus at work?



Is this a fungus at work?

Growing fungi from Sjögull in the lab



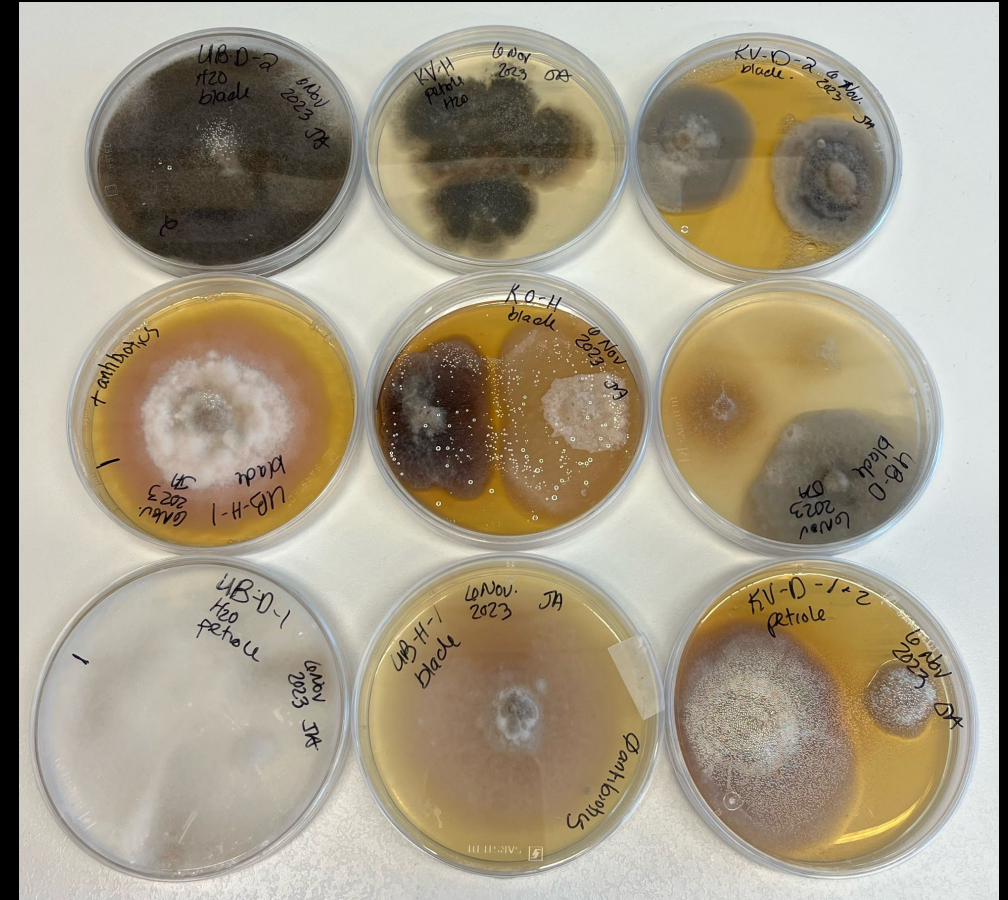
Is this a fungus at work?

Possibly yes

- the evidence is consistent with a fungal cause
- NOT yet confirmed

Next step

- DNA sequences from the fungi
- Compare to databases to identify



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Investigation of fungi associated with sjögull as possible causes of mass plant death

Havs
och Vatten
myndigheten

Winter
2024

Coordinated and standardized reporting system

- Simple survey form, accessible by link/QR code can upload photos
 - Designed with your input and interests (Kobotoolbox)
- What, where, when, how much, how it changes over time.
- What is going on where plants died in 2023?
- Locations of survivors (potential resistant plants or re-colonization)

May-
October
2024

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May-
October
2024

Sampling plan

- How to collect samples for study in the lab (train interested persons)
- Isolating and identification of the fungi found in sjögull

Winter
2024

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Contributed to this talk

Ingrid Hägermark

Carina Tennfors

Krister Reed

Fredrik Lorichs

Stina Drakare

Joel Segersten

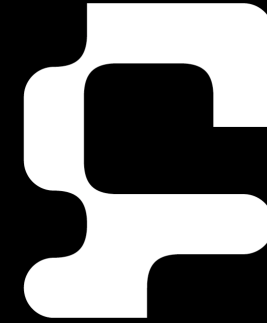
HAV

Lina Tomasson

Michael Diemer



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Online at: function.eu



@FUNCTION_EU

IUCN Aquatic Fungi
Specialist Group



FORMAS



biodiversa+
European Biodiversity Partnership





SCIENCE AND
EDUCATION **FOR**
SUSTAINABLE
LIFE

Is this a fungus at work?

- *Puccinia scirpi*

Reported in Sweden
länsstyrelsen i Kronoberg 2020

Not expected to be cause of
Plant deaths.



Is this a fungus at work?

- *Uromyces nymphoidis*

Reported in Europe, unknown for Sweden

Unknown if can cause plant death
Reports say it does NOT cause deformations or discolorations on leaves

Uromyces nymphoidis Sävul., *Bull. Sect. sci. Acad. roum.* 21: 4 (1939)



Relative of the pathogen. *Uromyces appendiculatus*