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Neohygrocybe nitrata, Nitrous Waxcap

Assessment by: Jordal, J.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Fungi	Basidiomycota	Agaricomycetes	Agaricales	Hygrophoraceae

Taxon Name: *Neohygrocybe nitrata* (Pers.) Wünsche

Synonym(s):

- *Agaricus nitratus* Pers.
- *Hygrocybe nitrata* (Pers.) Wünsche
- *Hygrophorus nitratus* (Pers.) Fr.

Common Name(s):

- English: Nitrous Waxcap
- French: Hygrophore à Odeur Nitreuse

Taxonomic Source(s):

Index Fungorum Partnership. 2019. Index Fungorum. Available at: <http://www.indexfungorum.org>.

Taxonomic Notes:

The species is moved from *Hygrocybe* s. lat. to *Neohygrocybe*, as *N. nitrata* (Pers.) Kovalenko, based on molecular methods (Lodge *et al.* 2013). The type is from England. The taxonomic status of a few GBIF occurrences in N America is uncertain; one sequenced was *H. ingrata* (Lodge *et al.* 2013) and these will therefore not be further treated here. One specimen sequenced from Russia was another species (Lodge *et al.* 2013). Synonyms: *Hygrophorus nitratus* (Pers.) Fr., *Hygrocybe nitrata* (Pers.) Wünsche, *Hygrocybe murinacea* ss. *auct.*

Assessment Information

Red List Category & Criteria: Vulnerable A2c+3c+4c [ver 3.1](#)

Year Published: 2019

Date Assessed: March 26, 2019

Justification:

Neohygrocybe nitrata is a species strongly confined to seminatural grasslands in Europe, up to alpine areas. The species is not rare everywhere, but the habitat is sharply declining due to changing agricultural practices, development projects and pollution. Over the distribution range we assume a total habitat loss of 30-50% over the last 50 years (approximately three generations: one generation is assumed to be about 17 years). Habitat quality has also become impaired and the decline in population size over this time could be even higher. This decline in habitat is ongoing and expected to continue over the next 50 years. GBIF lists more than 3500 occurrences. The species is assumed to have a population of more than 20,000 mature individuals. At a global scale (i.e. Europe) the decline is assumed to be on average 30-50% in 50 years (past, present and future). The species meets the threshold for VU (A2c+3c+4c).

Geographic Range

Range Description:

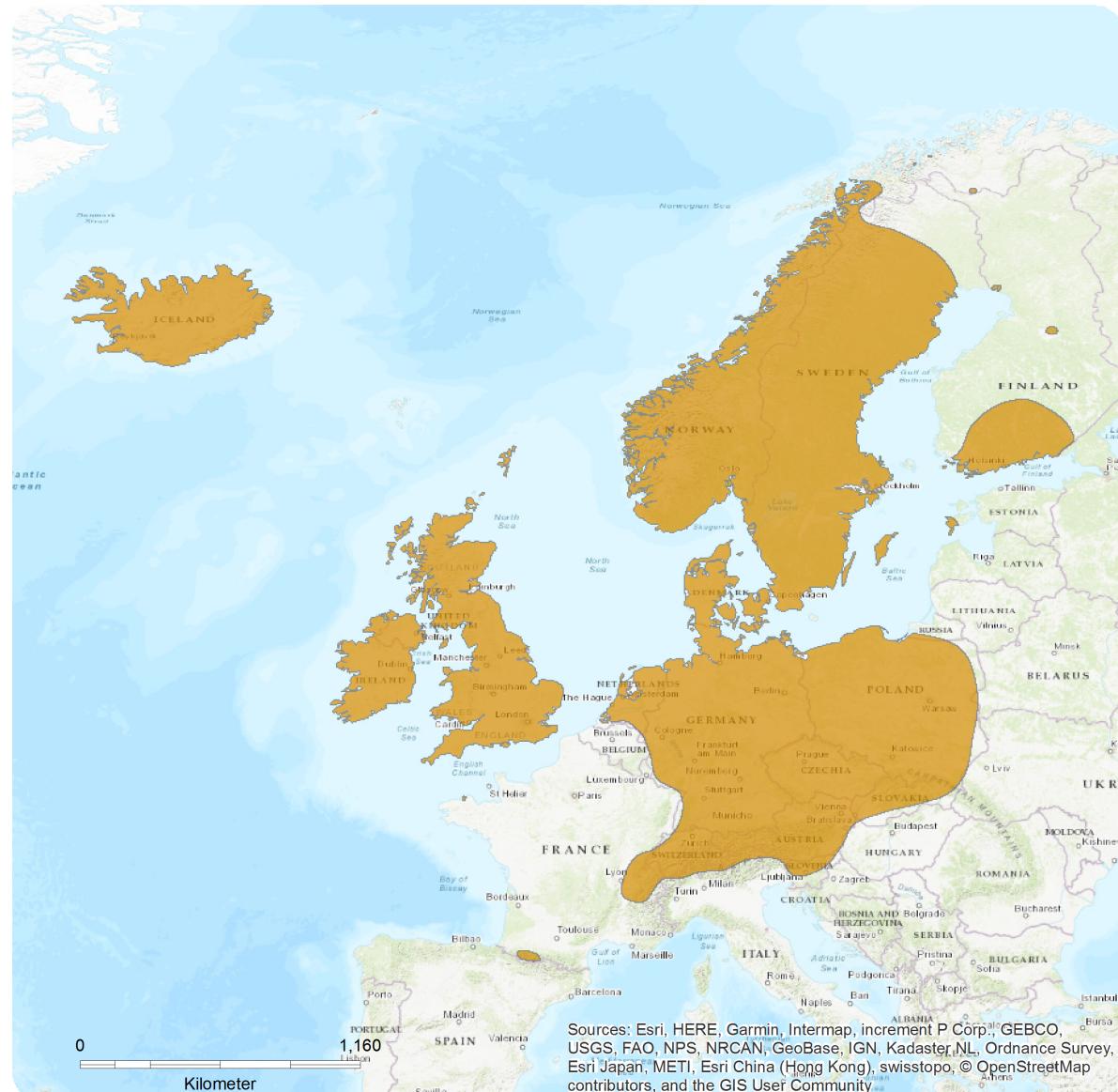
This species is known from most countries of western Europe, but records eastwards seem to be lacking. The eastern boundary is unclear due to lack of data. One sequenced specimen from Russia was another species (Lodge *et al.* 2013). It occurs regularly up to the forest limit and also sometimes up into the alpine zone in mountainous regions (2400 m a.s.l. in the Alps, Boertmann 2010). In Norway the frequency of this species in its habitats increases from sea level up to the forest limit (Jordal 1997).

Country Occurrence:

Native: Austria; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France; Germany; Iceland; Ireland; Italy; Latvia; Netherlands; Norway; Poland; Slovakia; Slovenia; Sweden; Switzerland; United Kingdom

Distribution Map

Neohygrocybe nitrata



Range

Extant (resident)

Compiled by:

IUCN



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



Population

GBIF (2019) lists more than 3500 occurrences. *Neohygrocybe nitrata* is a species strongly confined to seminatural grassland. Griffith *et al.* (2013) estimated a habitat loss of 90% over the last 75 years for the CHEG-fungi (grassland fungi of Clavariaceae, *Hygrocybe* s.l., *Entoloma* and Geoglossaceae) as a whole in Western Europe (i.e. loss in seminatural grasslands, based on available information). According to the Food and Agriculture Organization of the United Nations (FAO), the area of grasslands in the EU declined by 12.8% over 13 years (1990-2003). Also other sources point to a habitat loss of roughly 1% per year in Europe over a longer time, although the data quality is not always very good. We assume a total habitat loss of at least 30% over the last 50 years. As the habitat quality is also declining, population decline is suspected to be more than 30% in the last 50 years, probably closer to 50%. This trend is ongoing and expected to continue in the future.

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

Neohygrocybe nitrata is an indicator of mycologically rich but nutrient-poor, semi-natural grassland (a member of the waxcap grassland assemblage). This habitat, which may be of low conservation concern for its plant and animal diversity, is rapidly disappearing due to changes in land use (see Threats). It is found from the sea up to alpine grasslands and snowbeds in low alpine zone, like in Scandinavia and in the Alps. In Norway, most localities of the species are in seminatural grasslands (N=905; 92.6% in seminatural grasslands, only 3.5% in forests; Jordal *et al.* 2016), and similar patterns are found in other countries. Halbwachs *et al.* (2018) suggested that waxcaps are biotrophic endophytes or possibly mycorrhizal, but the details remain unclear. The fruit bodies are short-lived (weeks), but the mycelium is suspected to be longlived; >50-100 years.

Systems: Terrestrial

Use and Trade

The species is not known to be used.

Threats (see Appendix for additional information)

Habitat destruction and abandonment are the main threats to seminatural grasslands. The most important process is probably overgrowing due to ceased grazing/mowing of old seminatural grasslands as part of intensification of agriculture. Further modern cultivation methods like use of fertilizers, pesticides and ploughing. Also in some places changed land use with the construction of roads, industrial areas, settlements etc. Decline is expected to continue, as the areas of seminatural grasslands are of little economic importance in modern agriculture. Most waxcap grasslands are among types assessed as VU, EN or CR in the EU Red List of habitats (Janssen *et al.* 2016).

Conservation Actions (see Appendix for additional information)

The habitats should be protected against destruction due to intensification of agriculture or development plans. The maintaining of seminatural grasslands demands yearly grazing or mowing. If grazing by heavy animals destroys part of the soil, light animals like sheep should be recommended. Habitat conservation by governmental support to traditional agricultural practices is most important,

this exists in many countries to maintain extensive areas of agricultural areas, and should be extended to larger areas than today.

Further ecological research is needed to clarify the nutrient strategy of waxcaps. Management plans are needed. Habitat trends should be monitored.

Credits

Assessor(s): Jordal, J.

Reviewer(s): Ainsworth, A.M. & Mešić, A.

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External Resources

For [Images and External Links to Additional Information, please see the Red List website](#).

Appendix

Habitats

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

Habitat	Season	Suitability	Major Importance?
4. Grassland -> 4.2. Grassland - Subarctic	-	Suitable	-
4. Grassland -> 4.4. Grassland - Temperate	-	Suitable	-

Plant Growth Forms

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

Plant Growth Forms
Fungus

Threats

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

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	-	-	-
1. Residential & commercial development -> 1.2. Commercial & industrial areas	Ongoing	-	-	-
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.3. Agro-industry farming	Ongoing	-	-	-
4. Transportation & service corridors -> 4.1. Roads & railroads	Ongoing	-	-	-
9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.3. Herbicides and pesticides	Ongoing	-	-	-
9. Pollution -> 9.5. Air-borne pollutants -> 9.5.1. Acid rain	Ongoing	-	-	-

Conservation Actions Needed

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

Conservation Actions Needed
1. Land/water protection -> 1.1. Site/area protection
2. Land/water management -> 2.3. Habitat & natural process restoration

Conservation Actions Needed

4. Education & awareness -> 4.3. Awareness & communications

6. Livelihood, economic & other incentives -> 6.4. Conservation payments

Research Needed

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

Research Needed

1. Research -> 1.2. Population size, distribution & trends

1. Research -> 1.3. Life history & ecology

2. Conservation Planning -> 2.2. Area-based Management Plan

3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Habitats and Ecology

Generation Length (years): 17

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