

CHAPTER 1.5.

CRITERIA FOR LISTING SPECIES AS SUSCEPTIBLE TO INFECTION WITH A SPECIFIC PATHOGEN

Article 1.5.1.

Purpose

In each disease-specific chapter, Article X.X.2. lists the *aquatic animal* species that have been found to be susceptible to *infection* with the relevant *pathogenic agent*. The recommendations of each disease-specific chapter apply only to the species listed in Article X.X.2.

The purpose of this chapter is to provide criteria for determining which species are listed as susceptible in Article X.X.2. of each disease-specific chapter in the *Aquatic Code*.

Article 1.5.2.

Scope

Species of *aquatic animals* are considered susceptible to *infection* with a *pathogenic agent* when the presence of a multiplying or developing *pathogenic agent* has been demonstrated by the occurrence of natural cases or by experimental exposure that mimics natural transmission pathways. Susceptibility includes clinical or non-clinical *infection*.

The decision to list an individual species as susceptible in a disease-specific chapter should be based on a finding that the evidence is definite in accordance with Article 1.5.3. A taxonomic ranking higher than species is listed when the criteria in Article 1.5.9. are met.

Possible susceptibility of a species is also important information and, in accordance with Article 1.5.8., these species are included in Section 2.2.2. *Species with incomplete evidence for susceptibility* of the relevant disease-specific chapter of the *Aquatic Manual*.

Article 1.5.3.

Approach

A three-stage approach is outlined in this chapter to assess susceptibility of a species to *infection* with a specified *pathogenic agent* and is based on:

- 1) criteria to determine whether the route of transmission is consistent with natural pathways for the *infection* (as described in Article 1.5.4.);
- 2) criteria to determine whether the *pathogenic agent* has been adequately identified (as described in Article 1.5.5.);
- 3) criteria to determine whether the evidence indicates that presence of the *pathogenic agent* constitutes an *infection* (as described in Article 1.5.6.).

Article 1.5.4.

Stage 1: criteria to determine whether the route of transmission is consistent with natural pathways for the infection

The evidence should be classified as transmission through:

- 1) natural occurrence: includes situations where *infection* has occurred without experimental intervention e.g. *infection* in wild or farmed populations; or

- 2) non-invasive experimental procedures: includes cohabitation with infected hosts, *infection* by immersion or ingestion; or
- 3) invasive experimental procedures: includes injection, exposure to unnaturally high loads of *pathogenic agent*, or exposure to stressors (e.g. temperature) not encountered in the host's natural or culture environment.

Consideration needs to be given to whether experimental procedures (e.g. injection, infective load) mimic natural pathways for *disease* transmission. Consideration should also be given to environmental factors as these may affect host resistance or transmission of the *pathogenic agent*.

Article 1.5.5.

Stage 2: criteria to determine whether the pathogenic agent has been adequately identified

The *pathogenic agent* should be identified and confirmed in accordance with the methods described in Section 4 (diagnostic methods) of the relevant disease-specific chapter in the *Aquatic Manual*, or other methods that have been demonstrated to be equivalent.

Article 1.5.6.

Stage 3: criteria to determine whether the evidence indicates that presence of the pathogenic agent constitutes an infection

A combination of the following criteria should be used to determine *infection* (see Article 1.5.7.):

- A. the *pathogenic agent* is multiplying in the host, or developing stages of the *pathogenic agent* are present in or on the host;
- B. viable *pathogenic agent* is isolated from the proposed *susceptible species*, or infectivity is demonstrated by way of transmission to naive individuals;
- C. clinical or pathological changes are associated with the *infection*;
- D. the specific location of the *pathogenic agent* corresponds with the expected target tissues.

The type of evidence to demonstrate *infection* will depend on the *pathogenic agent* and potential host species under consideration.

Article 1.5.7.

Outcomes of the assessment

The decision to list a species as susceptible should be based on a finding of definite evidence. Evidence should be provided for the following:

- 1) transmission has been obtained naturally or by experimental procedures that mimic natural pathways for the *infection* in accordance with Article 1.5.4.;

AND

- 2) the identity of the *pathogenic agent* has been confirmed in accordance with Article 1.5.5.;

AND

- 3) there is evidence of *infection* with the *pathogenic agent* in the suspect host species in accordance with criteria A to D in Article 1.5.6. Evidence to support criterion A alone is sufficient to determine *infection*. In the absence of evidence to meet criterion A, satisfying at least two of criteria B, C or D would be required to determine *infection*.

Article 1.5.8.

Species for which there is incomplete evidence for susceptibility

The decision to list a species as susceptible in Article 1.5.2. of each disease-specific chapter should be based on a finding that the evidence is definite.

However, after application of Article 1.5.7., if there is incomplete evidence to demonstrate susceptibility of a species but partial information is available, these species will be included in Section 2.2.2. *Species with incomplete evidence for susceptibility* of the relevant disease-specific chapter in the *Aquatic Manual*.

If there is incomplete evidence to demonstrate susceptibility of a species, the *Competent Authority* should, prior to the implementation of any import health measures for the species, undertake a *risk assessment* for the *pathogenic agent* under consideration, in accordance with the recommendations in Chapter 2.1.

Article 1.5.9.

Listing susceptible species at a taxonomic ranking of Genus or higher

Some *pathogenic agents* have low host species specificity and can infect numerous species across multiple taxa. These *pathogenic agents* are eligible for assessment using this article if they have at least one *susceptible species* in each of three or more taxa at the ranking of Family. The outcome of applying this article may be that *susceptible species* are listed in Article X.X.2. of each disease-specific chapter at a ranking of Genus or higher.

- 1) For *pathogenic agents* that have a low host species specificity, a decision to conclude susceptibility of species at a taxonomic ranking of Genus or higher should only be made where:
 - a) after application of Article 1.5.7., more than one species within the taxonomic ranking has been found to be susceptible;AND
 - b) no species within the taxonomic ranking has been found to be non-susceptible to *infection*;AND
 - c) the taxonomic ranking is at the lowest level supported by evidence of points a) and b).
- 2) Evidence of non-susceptibility of a species to *infection* includes:
 - a) absence of *infection* in a species exposed to the *pathogenic agent* in natural settings where the *pathogenic agent* is known to be present and has caused *infection* in co-located *susceptible species*;OR
 - b) absence of *infection* in a species exposed to the *pathogenic agent* through appropriately designed experimental procedures.

NB: FIRST ADOPTED IN 2014; MOST RECENT UPDATE ADOPTED IN 2019.

