CHAPTER 1.5.

SURVEILLANCE
~~OF~~ <mark>FOR</mark> ARTHROPOD VECTORS OF
ANIMAL DISEASES

EU position

The EU can support the adoption of the modified chapter.

Article 1.5.1.

Introduction

Vector-borne *diseases* are of increasing importance economically and to human and animal health.

Environmental (including climate change), sociological and economical changes may affect the distribution and impact of these *diseases*.

Improved understanding of the distribution and population dynamics of the *vectors* is a key element for assessing and managing the *risks* associated with *vector*-borne animal and zoonotic *diseases*.

The *Terrestrial Code* contains recommendations for the *surveillance* of several *vector*-borne *diseases* and general recommendations for animal health *surveillance*.

The need has arisen to complement these general recommendations on *surveillance* with additional advice on the *surveillance* ~~of~~ <mark>for</mark> *vectors* themselves. This chapter only addresses *surveillance* for arthropod *vectors*.

For the purpose of trade, it ~~must~~ <mark>should</mark> be noted that there is no conclusive relationship between the presence of a *vector(s)* and the disease status of a country/*zone*, and also that the apparent absence of a *vector(s)* does not by itself confirm *vector*-free status.

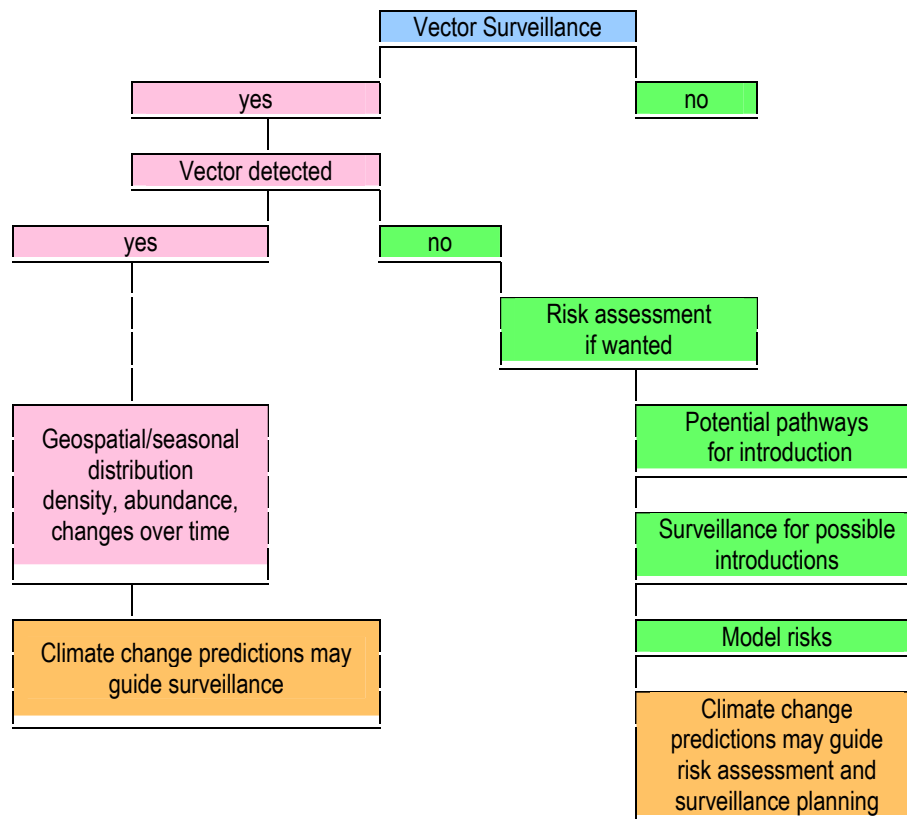A decision tree for *vector surveillance* is presented in Figure 1.

Article 1.5.2.

Objectives

The objective of these recommendations is to provide methods for:

1. gathering up-to-date information on the spatial and temporal distribution and abundance of *vectors* of the arthropod-borne *OIE-listed diseases* and *emerging diseases*;

2. monitoring changes in the spatial and temporal distribution and abundance of these *vectors*;

3. collecting relevant data to inform *risk assessment* (including *vector* competency) and *risk management* of these *vector*-borne *diseases*;

4. detecting the presence of specific *vectors* or confirming their absence;

5. understanding pathways of entry for *vectors* and *vector*-borne pathogenic agents.

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Figure 1 Decision Tree for Vector Surveillance

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                          ┌──────────────────────┐
                          │  Vector Surveillance │
                          └──────────────────────┘
        ┌──────────────┐                      ┌──────────────┐
        │     yes      │                      │     no       │
        └──────────────┘                      └──────────────┘
        ┌──────────────┐
        │ Vector detected │
        └──────────────┘
    ┌──────────┐        ┌──────────┐
    │   yes    │        │   no     │
    └──────────┘        └──────────┘
                                   ┌──────────────────┐
                                   │ Risk assessment  │
                                   │ if wanted        │
                                   └──────────────────┘
 ┌─────────────────────┐              ┌─────────────────────┐
 │ Geospatial/seasonal │              │ Potential pathways  │
 │ distribution        │              │ for introduction    │
 │ density, abundance, │              └─────────────────────┘
 │ changes over time   │              ┌─────────────────────┐
 └─────────────────────┘              │ Surveillance for    │
                                      │ possible            │
                                      │ introductions       │
                                      └─────────────────────┘
                                      ┌─────────────────────┐
                                      │ Model risks         │
                                      └─────────────────────┘
 ┌─────────────────────┐              ┌─────────────────────┐
 │ Climate change      │              │ Climate change      │
 │ predictions may     │              │ predictions may     │
 │ guide surveillance  │              │ guide risk          │
 └─────────────────────┘              │ assessment and      │
                                      │ surveillance planning│
                                      └─────────────────────┘
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                    Article 1.5.3.
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Sampling methodology

1. Sampling plan

   a) The objective of the *surveillance* programme should be determined and stated before planning begins.

   b) All available historical data on the *vector* or the *disease* for the country or *zone* should be collated and assessed.

   c) The sampling plan should consider the following:

      i) the biology and ecology of the *vector(s)*,

      ii) the presence, distribution and abundance of the *vectors*' host animal population(s),

      iii) the environmental, climatic, ecological and topographic conditions of relevance to *vector* ecology,

      iv) the need for a *risk assessment* to indicate the areas at highest *risk* of introduction of a *vector* that is unlikely to be present.

d) Sampling should be aimed at:

    i) establishing *vector* presence or confirming *vector* absence in the country or *zone*,

    ii) describing the distribution of the *vector(s)* within the country or *zone*,

    iii) providing additional information on *vector* density and spatial/temporal variability (both over the short- and the long-term),

    iv) early detection of *vectors* or *vector*-borne pathogenic agents in areas with *risks* of entry and establishment.

e) The sampling plan should be designed to provide appropriate estimates of the indicators listed above. Consideration should be given to the following:

The recommended general approach to sampling is via a three-stage hierarchy:

    i) Stratification based on ecological criteria (where possible), and *risk assessment* for *vector* introduction,

    ii) subdivision of strata into spatial sampling units, and

    iii) establishment of actual sampling sites within selected spatial sampling units.

If adequate <u>entomological,</u> epidemiological and historical data and/or expert opinion exists, the sampling plan may be refined or targeted by defining strata which are as ~~homogenous~~ <u>homogeneous</u> as possible with respect to the following known or suspected *risk*-factors, as appropriate for the country or *zone*:

    iv) domestic or wild populations of host animals preferred by the *vector*,

    v) *vector* habitat suitability,

    vi) climatic patterns (including seasonal),

    vii) areas endemically and/or epidemically affected by the *disease<u>(s)</u>* of concern,

    viii) areas of known *vector* occurrences,

    ix) fringe *zone(s)* around areas of known *vector* occurrences or other high *risks* areas for *vector* introduction, such as port<u>s</u>,

    x) areas in which the *disease(s)* or *vector(s)* of concern have not been reported currently or historically,

    xi) each stratum (or the whole country or *zone*, if not stratified) should be divided into spatial sampling units according to standard methodologies such as a grid system,

    xii) the number and size of the spatial sampling units should be defined to provide appropriate estimates of the indicators listed above,

    xiii) the number and location of actual sampling sites within each spatial sampling unit also should be defined to provide appropriate estimates of the indicators listed above,

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xiv) different levels of sampling intensity (spatial sampling unit size, number of units sampled, number of sites sampled within units, and sampling frequency) may be applied to different strata into which the country or *zone* has been divided. For example, more intensive sampling might be carried out in strata where *vector* presence seems most likely, based on biological or statistical criteria.

2. Sampling methods

Many sampling methods have been developed for the capture of *vector* arthropods, and these differ according to the *disease/vector* system under consideration.

a) The collection methods used should be adapted as required to ensure reasonable confidence of collecting the *vector(s)* of concern.

b) Collection methods should obtain the various developmental stages (such as eggs, larvae, nymphs, adults) and adult age categories, as appropriate to the species in question and the objectives of the surveillance. For example, if a *vector* is not believed to be present, collection methods should target the developmental stages most likely to be introduced, or that are most readily detected. If the *vector* is present, life stages required to estimate population survival rates and population dynamics in relation to *disease* transmission should be collected.

c) Different collection methods may be required to obtain samples from a single *vector* species, depending on the life stage or place of capture (such as from the environment or from the host animals). The collection method ~~must~~ should be appropriate to the species and life stage of interest.

The collection methods should preserve the *vector(s)* in a manner suitable for their morphological identification or identification with molecular techniques. Where the purpose of sampling is to detect or isolate a pathogenic agent(s), specific protocols should be followed to ensure the samples are suitable for these assays.

3. Data management, analysis and interpretation

Data management and analytical methodologies should be done in accordance with Chapter 1.4.

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