Annex 28

Chapter 8.Z.

**Infection with *Trypanosoma evansi*(Surra)**

Article 8.Z.1

General provisions

Surra is a disease caused by *Trypanosoma evansi* of the subgenus Trypanozoon and may manifest in acute, chronic or clinically inapparent forms.

*T. evansi* is a blood and tissue parasite that occasionally invades the nervous system. It can infect a large range of domestic and *wild* mammals. The disease has a significant socio-economic impact on animal production, especially in horses, camels, donkeys, buffaloes and cattle; it can also affect goats, sheep, deer, pigs, rodents and elephants. It has a serious clinical impact in dogs, cats and non-human primates, and may occasionally infect humans.

*T.* *evansi* is mainly transmitted mechanically by several biting flies (e.g. tabanids, *Stomoxys* spp.), but can also be transmitted vertically, iatrogenically and possibly venereally. Additionally, it is transmitted perorally (especially to carnivores) and it can be transmitted biologically by the bite of vampire bats (*Desmodus* spp.), which may act as host, reservoir or *vector*.

Co-infection of *T. evansi* with other *Trypanosoma* species (including *T.* *vivax*, *T. brucei*, *T. congolense*, *T. simiae*, *T. equiperdum* and *T. cruzi*) may occur although this may not always be detected using routine testing methods.

For the purposes of the *Terrestrial Code*, surra is defined as an *infection* of susceptible animals with *T. evansi*.

For the purposes of this chapter, ‘susceptible animals’ means domestic and *wild* animals from the following families: Equidae, Camelidae, Bovidae, Suidae, Canidae, Felidae; the orders Rodentia and Lagomorpha; and non-human primates.

The following defines the occurrence of *Infection* with *T. evansi*:

1) trypanosomes with *Trypanozoon* morphology have been observed in a sample from a susceptible animal and identified as *T. evansi* by the detection of nucleic acid; or

2) trypanosomes with *Trypanozoon* morphology have been observed in a sample from a susceptible animal epidemiologically linked to a confirmed *case* of *infection* with *T. evansi* or with relevant epidemiological context (including clinical signs, endemicity, origin of the host, absence of other *Trypanosoma* spp., absence of tsetse transmission) to support surra; or

3) nucleic acid specific to *Trypanozoon* has been detected in a sample from a susceptible animal epidemiologically linked to a confirmed *case* of *infection* with *T. evansi* or with relevant epidemiological context (including clinical signs, endemicity, origin of the host, absence of other *Trypanosoma* spp., absence of tsetse transmission) to support surra; or

4) antibodies specific to *Trypanosoma* spp. have been detected in a sample from a susceptible animal epidemiologically linked to a confirmed *case* of *infection* with *T. evansi* or with relevant epidemiological context (including clinical signs, endemicity, origin of the host, absence of other *Trypanosoma* spp., absence of tsetse transmission) to support surra.

For the purposes of the *Terrestrial Code*, the *incubation period* of *infection* with *T. evansi* shall be 90 days in all species of susceptible animals.

For the purposes of this chapter, a temporary importation of horses refers to the introduction of horses into a country or *zone*, for a defined period of time, not exceeding 90 days, during which the *risk* of transmission of the *infection* is mitigated through specific measures under the supervision of the *Veterinary Authority.* Temporarily imported horses are re-exported at the end of this period. The duration of the temporary importation period and the destination after this period, as well as the conditions required to leave the country or *zone,* should be defined in advance.

Standards for diagnostic tests are described in the *Terrestrial Manual*.

Article 8.Z.2.

Safe commodities

When authorising import or transit of the following *commodities, Veterinary Authorities* should not require any surra-related conditions regardless of the *animal health* *status* of the *exporting country* or *zone*:

1) pasteurised *milk* and pasteurised *milk products*;

2) hair, wool and fibre;

3) gelatine and collagen;

4) horns, hooves and claws;

5) *meat* from animals that have been slaughtered in a *slaughterhouse/abattoir* and have been subjected to ante- and post-mortem inspections with favourable results;

6) *meat products*;

7) hides and skins (except raw);

8) embryos or oocytes collected, processed, and stored in accordance with Chapters 4.8. to 4.10.

Article 8.Z.3.

Country or zone free from surra

A country or *zone* may be considered free from surra when:

1) the *infection* is notifiable in the entire country for at least the past two years;

2) measures to prevent the introduction of *infection* have been in place; in particular, the importations or movements of susceptible animals and other *commodities* into the country or *zone* have been carried out in accordance with this chapter and other relevant chapters of the *Terrestrial Code*;

3) and either:

a) the country or *zone* is historically free as described in Article 1.4.6.; or

b) for at least the past two years, *surveillance* in accordance with Articles 8.Z.16. to 8.Z.19. has been in place in the entire country or zone and there has been no *case* in the country or *zone*.

In order to maintain its status, a country or *zone* free from *infection* with *T. evansi* adjacent to an infected country or *zone* should include an area along the border, in which *surveillance* is conducted in accordance with Articles 8.Z.12. to 8.Z.15.

Article 8.Z.4.

**Compartment free from surra**

The establishment of a [*compartment*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_compartiment) free from surra should follow the provisions laid down in this chapter and in Chapters [4.4.](http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_zoning_compartment.htm#chapitre_zoning_compartment) and 4.5.

Susceptible animals in the free *compartment* should be protected against the *vectors* by the application of an effective *biosecurity* management system.

Susceptible animals in the free *compartment* should be protected against both iatrogenic and venereal transmission.

Article 8.Z.5.

Recovery of free status

Should a *case* of *infection* with *T. evansi* occur in a previously free country or *zone*, its status may be recovered after the following:

1) *cases* have been isolated and then immediately treated, killed or slaughtered and appropriately disposed of;

2) animals in contact with *cases* have been put immediately under protection from *vector* contact and tested;

3) appropriate *biosecurity* is in place, including *vector* control or protection from *vector* contacts in the affected area in accordance with Articles 1.5..2. to.1.5.3.;

4) *surveillance* in accordance with Articles 8.Z.12. to 8.Z.15. has been carried out with negative results;

5) for six consecutive months, either:

a) after the last *case* was killed or slaughtered, the animals in contact have undergone monthly repeated serological and agent identification (microscope and molecular) tests with negative results in all tests; or

b) if appropriate trypanocide treatment is applied to the *cases*, after the last *case* was killed, slaughtered or treated, whichever occurred last, both treated and in contact animals have undergone monthly repeated agent identification tests (microscope and molecular) with negative results, and serological tests with decreasing titres.

If points 1 to 5 are not applied, Article 8.Z.3. applies.

Article 8.Z.6.

Recommendations for importation of susceptible animals (except dogs and cats) from countries, zones or compartments free from surra

[*Veterinary Authorities*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_autorite_veterinaire) of [*importing countries*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_pays_importateur) should require the presentation of an [*international veterinary certificate*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_certificat_veterinaire_international)attesting that the animals:

1. showed no clinical sign of *infection* with *T. evansi* on the day of shipment;
2. were kept since birth or at least six months prior to shipment in a free country, *zone* or *compartment*;
3. did not transit through an *infected* *zone* during transportation to the *place of shipment* or were protected from *vectors* or any source of *T. evansi* by the application of effective *biosecurity* during transportation to the place of shipment.

Article 8.Z.7.

Recommendations for importation of susceptible animals (except dogs and cats) from countries or zones infected with *T. evansi*

[*Veterinary Authorities*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_autorite_veterinaire) of [*importing countries*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_pays_importateur) should require the presentation of an [*international veterinary certificate*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_certificat_veterinaire_international)attesting that animals:

1. showed no clinical sign of *infection* with *T. evansi* during isolation and on the day of shipment;
2. were isolated in a *quarantine station* for at least 90 days prior to shipment, and all animals from the same *flock* or *herd* were subjected to serological and agent identification (microscope and molecular) on two occasions, immediately prior to entering quarantine and within 15 days before being released from quarantine, with negative results.

Article 8.Z.8.

Recommendations for importation of susceptible animals from countries or zones infected with *T. evansi* for immediate slaughter

[*Veterinary Authorities*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_autorite_veterinaire) of [*importing countries*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_pays_importateur) should require the presentation of an [*international veterinary certificate*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_certificat_veterinaire_international)attesting that the animals:

1. showed no clinical sign of *infection* with *T. evansi* on the day of the shipment;
2. were negative in an agent identification (microscope and molecular) and a serological test within 15 days prior to shipment;
3. were kept for the six months prior to shipment in an *establishment* in which *surveillance* in accordance with Articles 8.Z.12., 8.Z.13. and 8.Z.14. demonstrates that no *case* had occurred during that period;
4. were permanently identified and transported under the supervision of the *Veterinary Services* in a *vector-*protected *vehicle*, which underwent *disinfection* and disinsection before *loading*, directly from the *establishment* of origin to the *place of shipment* without coming into contact with other susceptible animals.

Article 8.Z.9.

Recommendations for the temporary importation of horses

If the importation of horses on a temporary basis does not comply with the recommendations in Article 8.Z.6. or Article 8.Z.7., *Veterinary Authorities* of *importing countries* should:

1) require:

a) the equids be accompanied by a passport in accordance with the model contained in Chapter 5.12. or be individually identified as belonging to a high health status *subpopulation* as defined in Chapter 4.17.;

b) the presentation of an *international veterinary certificate* attesting that the equids:

1. were negative in an antibody detection test within 15 days prior to departure from the country of origin;
2. showed no clinical sign of *infection* with *T. evansi* on the days of shipments;

c) the duration of the temporary importation period and the destination after this period, and the conditions required to leave the country or *zone* be defined;

2) ensure that during their stay in the country or *zone*:

a) measures are taken to protect from *vectors* or any source of *T. evansi* by the application of effective *biosecurity*;

b) the equids were not subjected to any practice that may represent a risk of iatrogenic transmission of *infection* with *T. evansi;*

c) the equids are kept and transported individually in stalls and *vehicles/vessels* which are subsequently cleaned and disinsected before re-use.

Article 8.Z.10.

Recommendations for importation of semen of susceptible animals from countries, zones or compartments free from surra

[*Veterinary Authorities*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_autorite_veterinaire) of [*importing countries*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_pays_importateur) should require the presentation of an [*international veterinary certificate*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_certificat_veterinaire_international)attesting that:

1. the donor males:

a) showed no clinical sign of *infection* with *T. evansi* on the day of semen collection;

b) have been kept for at least six months prior to semen collection in a free country, *zone* or *compartment*; and

1. the semen was collected, processed and stored in accordance with Chapters 4.6. and 4.7.

Article 8.Z.11.

Recommendations for importation of semen of susceptible animals from countries or zones infected with *T. evansi*

[*Veterinary Authorities*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_autorite_veterinaire) of [*importing countries*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_pays_importateur) should require the presentation of an [*international veterinary certificate*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_certificat_veterinaire_international)attesting that:

1. the donor males:
   1. have been kept for at least six months prior to semen collection in an *establishment* in which *surveillance* in accordance with Articles 8.Z.12., 8.Z.13. and 8.Z.14. demonstrates that no *case* had occurred during that period;
   2. showed no clinical sign of *infection* with *T. evansi* on the day of semen collection;
   3. were negative in an agent identification (microscopic) and a serological test on a blood sample collected on the day of collection of the semen;
2. molecular examination of semen for *T. evansi* was negative;
3. the semen was collected, processed and stored in accordance with Chapters 4.6. and 4.7.

Article 8.Z.12.

Introduction to surveillance

Articles 8.Z.12. to 8.Z.14. define the principles and provide guidance on *surveillance* for *infection* with *T. evansi*, complementary to Chapter 1.4. and Chapter 1.5.

The purpose of *surveillance* could be the demonstration of the absence of *infection*, the early detection of *cases*, or the measurement and monitoring of the *prevalence* and distribution of the *infection* in a country, *zone* or *compartment*.

An important component of the epidemiology of surra is the capability of its *vectors*, which provides a measure of disease risk that incorporates *vector* competence, abundance, biting rates, survival rates, host affinity and in the case of biological *vectors*, the extrinsic *incubation period*. However, methods and tools for measuring some of these *vector* factors remain to be developed, particularly in a field context. Therefore, *surveillance* for *infection* with *T. evansi* should focus on transmission of *T. evansi* in susceptible animals.

The impact and epidemiology of surra widely differs between different regions of the world and therefore, it is not appropriate to provide specific recommendations for all situations. Member Countries should provide scientific data explaining the epidemiology of the disease in the country or *zone* concerned and adapt the *surveillance* strategies for defining their status to the local conditions. There is considerable latitude available to Member Countries to justify their status at an acceptable level of confidence.

Consideration should be given to risk factors such as susceptibility, co-infections with other *Trypanosom*a spp. and climate change.

Although *surveillance* in susceptible *wild animals* presents challenges that may differ significantly from those in domestic *animals*, *wildlife* should be considered in the *surveillance* system as they are included in the case definition and can serve as reservoirs of *infection* and as indicators of *risk* to domestic *animals.*

Article 8.Z.13.

General conditions and methods of surveillance

The *surveillance* system for *infection* with *T. evansi* should be in accordance with Chapter 1.4. and be under the responsibility of the *Veterinary Authority*.

1) It should include:

1. formal and ongoing system for detecting and investigating *outbreaks* of disease;
2. each country should establish a *surveillance* system or integrate activities into already established animal health *surveillance* programmes for purposes of sustainablity;
3. the collection and transport of samples from suspected *cases* to a *laboratory* for diagnosis or a procedure for the rapid diagnosis in the field;
4. appropriate tools, for collection, recording, managing and analysis of data; reporting and dissemination for decision making.

2) In addition, it should, at least:

1. in a free country or *zone,* have an *early warning system* capable of detecting *T. evansi* which obliges animal owners and keepers and other stakeholders who have regular contact with susceptible animals, as well as *veterinarians* or *veterinary paraprofessionals*, to report promptly any suspicion of *infection* with *T. evansi* to the *Veterinary Authority*;
2. include representative or risk-based serological or parasitological surveys appropriate to the status of the country, *zone* or compartment.

An effective *surveillance* system will periodically identify suspected *cases* that require follow-up and investigation to confirm or exclude whether the cause of the condition is *T. evansi*. The rate at which such suspected *cases* are likely to occur will differ between epidemiological situations and cannot therefore be reliably predicted. All suspected *cases* should be investigated immediately, and samples should be taken and submitted to a *laboratory*.

Article 8.Z.14.

Surveillance strategies

The target *population* should include domestic and *wild* susceptible animals of epidemiological significance within the country, *zone or compartment.* Active and passive *surveillance* for surra should be ongoing as epidemiologically appropriate. *Surveillance* should be composed of representative or risk-based approaches using parasitological, serological, clinical and entomological methods appropriate for the status of the country, *zone or compartment*.

In a free country, *zone* or *compartment,* it is appropriate to focus *surveillance* in an area adjacent to an infected country, *zone* or *compartment*, considering relevant ecological or geographical features likely to interrupt the transmission of surra.

A Member Country should justify the *surveillance* strategy chosen as being adequate to detect the presence of *infection* with *T. evansi* in accordance with Chapter 1.4. and Chapter 1.5., and with the prevailing epidemiological situation.

If a Member Country wishes to declare freedom from surra in a specific *zone*, the design of the *surveillance* strategy should be targeted to the susceptible population within the *zone*.

For random surveys, the sample size selected for testing should be large enough to detect evidence of *infection* if it were to occur at a predetermined minimum expected *prevalence*. The sample size and expected *prevalence* determine the level of confidence in the results of the survey. The Member Country should justify the choice of the minimum expected *prevalence* and confidence level based on the objectives of *surveillance* and the epidemiological situation, in accordance with Chapter 1.4. Irrespective of the survey approach selected, the sensitivity and specificity of the diagnostic tests employed are key factors in the design, sample size determination and interpretation of the results obtained. Ideally, the sensitivity and specificity of the tests used should be validated for the *infection* history and the different *Trypanosoma* species and other Kinetoplastid species (*T. vivax, T. congolense, T. brucei*, *T. equiperdum*, *T. cruzi* and *Leishmania* spp.) present in the target population.

Irrespective of the testing system employed, *surveillance* system design should anticipate the occurrence of cross reactions. There should be an effective procedure for following up cross reactions to determine, with a high level of confidence, whether they are indicative of *infection* with *T. evansi* or not. This should involve both supplementary tests and follow-up investigation to collect diagnostic material from the original sampling unit as well as those which may be epidemiologically linked to it.

The principles involved in *surveillance* are technically well defined. The design of *surveillance* programmes to prove the absence of *infection* with *T. evansi* should be carefully followed to avoid producing results that are either insufficiently reliable to be accepted by international trading partners, or excessively costly and logistically complicated.

The results of random or targeted surveys are important in providing reliable evidence that no *infection* with *T. evansi* is present in a country, *zone* or *compartment*. It is, therefore, essential that the survey is thoroughly documented. It is critical to consider the movement history of the animals being sampled when interpreting the results.

An active programme of *surveillance* of susceptible populations to detect evidence of *infection* with *T. evansi* is essential to establish the *animal health status* of a country, *zone or compartment.*

1. Clinical surveillance

Clinical *surveillance* aims to detect clinical signs of *infection* with *T. evansi* in susceptible animals, particularly during a newly introduced *infection*. However, neither clinical nor post-mortem signs of *infection* with *T. evansi* are pathognomonic. Therefore, suspected *cases* of *infection* with *T. evansi* detected by clinical *surveillance* should always be confirmed by direct or indirect laboratory tests that confirm the presence of *T. evansi*.

2. Parasitological surveillance

Parasitological examination (or agent identification)can be conducted to:

1. detect active *infection*;
2. confirm clinically suspected *cases*;

c) identify parasites at the subgenus level;

d) confirm active *infection* after positive serological results.

3. Molecular techniques

Molecular techniquescan be conducted to:

a) increase the sensitivity of the detection of active *infections*;

b) confirm clinically suspected *cases*;

c) identify parasites at the subgenus level (Trypanozoon), or at the species level (*T. evansi*); (in the host and/or the *vector*);

d) confirm active *infection* after positive serological results.

4. Serological surveillance

a) Serological testing of susceptible animals is one of the most effective methods for detecting exposure to *T. evansi*. The host species tested should reflect the epidemiology of the disease. Management variables that may influence likelihood of *infection*, such as animal treatment, should be considered.

b) Owing to cross reactions with other Kinetoplastid species, co-infections with these pathogenic agents should be considered when interpreting the results of the serological *surveillance* system.

c) Serological techniques can be conducted to:

i) demonstrate individual or population freedom;

ii) detect subclinical or latent *infection* by *T. evansi*;

iii) determine by seroprevalence the magnitude of *infection* by *T. evansi* in the host population.

d) Positive test results can have different possible causes:

i) current *infection*;

ii) antibodies from previous *infection* (after effective treatment or self-cure);

iii) maternal antibodies;

iv) cross reactions with other Kinetoplastid species.

5. Sentinel animals

Sentinel *surveillance* may provide evidence of freedom from [*infection*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_infection) or provide data on *prevalence* and *incidence* as well as the distribution of the [*infection*](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_infection). Sentinel *surveillance* may consist of:

a) the identification and regular testing of one or more of sentinel [animal](http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#terme_animal) units of known health or immune status in a specified geographical location to detect the occurrence of *infection* with *T. evansi*;

b) the investigation of clinical suspect *cases* targeting highly susceptible animals such as dogs (hunting dogs and dogs living around *slaughterhouses/abattoirs*), camels, donkeys or horses.

6. Vector surveillance

This point should be read in conjunction with Chapter 1.5.

For the purposes of this chapter, *vector* *surveillance* aims at determining different levels of *risk* by identifying the presence and abundance of various *vector* species (biting flies and vampire bats) in an area.

The most effective way of gathering *vector* *surveillance* data should consider the biology and behavioural characteristics of the local *vector* species and include traps, net, sticky targets or other collection tools. The choice of the number and type of collecting tools to be used and the frequency of their use should be made by considering the size and ecological characteristics of the area to be surveyed. In the *surveillance* of *wildlife* species, molecular techniques may be applied to *vectors*.

When sentinel animals are used, *vector surveillance* should be conducted at the same locations.

Article 8.Z.15.

Additional surveillance procedures for recovery of free status

In addition to the general conditions described in this chapter, a Member Country seeking recovery of country or *zone* free status, including a *containment zone* established in accordance with Article 4.4.7., should show evidence of an active *surveillance* programme to demonstrate absence of *infection* with *T. evansi*.

Populations under this *surveillance* programme should include:

1) *establishments* in the proximity of the *outbreak*;

2) *establishments* epidemiologically linked to the *outbreak*;

3) *animals* moved from previously affected *establishments*;

4) *animals* used to re-populate previously affected *establishments*.

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