Ad hoc Group on peste des petits ruminants (PPR)

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Virtual

12 – 14 November 2024

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A virtual meeting of the *ad hoc* Group on peste des petits ruminants (PPR) (hereafter the Group) was held on 12, 13 and 14 November 2024. Because no dossiers for official recognition of PPR-free status or endorsement of official PPR control programmes were submitted to WOAH in this cycle, the purpose of the meeting was to review selected provisions under Chapter 14.7, "Infection with Peste des Petits Ruminants Virus," of the *Terrestrial Animal Health Code* (*Terrestrial Code*), as requested by the Terrestrial Animal Health Standards Commission (the Code Commission) during its September 2024 meeting. Additionally, the experts have been asked to provide their opinion on the minimum supportive information required from Members to demonstrate compliance with the relevant provisions of the *Terrestrial Code* during the annual reconfirmation of PPR-free status in the framework of WOAH's ongoing work to streamline the annual reconfirmation procedure.

1. Opening

Dr Montserrat Arroyo, WOAH Deputy Director General for International Standards and Science, opened the meeting by warmly welcoming the Group. Dr Arroyo thanked the experts and the representative of the Scientific Commission for Animal Diseases for their availability and contributions to WOAH's work. She also extended her appreciation to their supporting institutions and national governments for enabling their participation in this meeting. Dr Arroyo thanked the Group for their substantial efforts, both in preparation for the meeting and during its proceedings, as well as for the work that would follow when drafting the report. She emphasised the importance of establishing practical provisions in the WOAH Standards that are supported by robust scientific evidence and clear rationale. She reminded the experts of the importance of declaring any potential conflict of interest and thanked them for having signed the Declaration of Interest form prior to the meeting.

2. Adoption of the agenda and appointment of Chairperson and Rapporteur

Dr Michael Baron was appointed as chair, and Dr Abdelmalik Ibrahim Khalafalla acted as rapporteur with the support of the WOAH Secretariat. The Group endorsed the proposed agenda.

The Terms of Reference, list of participants and agenda are provided in Appendices 1, 2 and 3, respectively.

3. Role of wild animals and unusual hosts in the epidemiology of PPR

The Group was tasked by the Code Commission to review the role of wild ruminants and unusual hosts in the epidemiology of PPR and to provide advice on whether the definition of infection with PPR virus (PPRV) in Chapter 14.7. of the *Terrestrial Code* should be expanded to include species beyond domestic sheep and goats. The discussions were guided by instructions from the WOAH Taskforce on updating the designation of animal hosts, as well as recent scientific articles examining the potential involvement of wildlife and unusual hosts in the maintenance and transmission of PPRV.

The Group discussed and agreed that scientific evidence suggests that the following species can be infected with PPRV and develop clinical signs of the disease but there is no evidence at the moment that their populations maintain the virus in circulation: wild goats (*Capra aegagrus*), wild sheep (*Ovis orientalis*), Afghan Markhor goats (*Capra falconeri*), Barbary sheep (*Ammotragus lervia*), bharals (*Pseudois nayaur*), Laristan sheep (*Ovis orientalis laristani*), Dorcas gazelles (*Gazella dorcas*), Gemsbok (*Oryx gazella*), Nubian Ibex (*Capra ibex nubiana*), Nilgai (*Boselaphus tragocamelus*), Saiga antelope (*Saiga tatarica*), Sindh ibex (*Capra aegagrus blythi)*, Thomson's gazelles (*Gazella thomsoni*), and dromedary camels (C*amelus dromedarius*)[1,2,3,4]. In addition, pigs[5], wild boar[3] and white-tailed deer[6] have been infected experimentally. In

[1] Dou, Yongxi, et al. "Expanding diversity of susceptible hosts in peste des petits ruminants virus infection and its potential mechanism beyond." *Frontiers in veterinary science* 7 (2020): 66.
[2] SowjanyaKumari, S., Bhavya, A.P., Akshata, N., Kumar, K.V., Bokade, P.P., Suresh, K.P., Shome, B.R. and Balamurugan, V. (2021). Peste Des Petits Ruminants in Atypical Hosts and Wildlife: Systematic Review and Meta-Analysis of the Prevalence between 2001 and 2021. *Archives of Razi Institute*, [online] 76(6), pp.1589–1606. doi:https://doi.org/10.22092/ari.2021.356900.1939.
[3] Wohlsein, P. and Singh, R.P. (2014). Peste des Petits Ruminants in Unusual Hosts: Epidemiology, Disease, and Impact on Eradication. *Peste des Petits Ruminants Virus*, pp.95–118. doi:https://doi.org/10.1007/978-3-662-45165-6_6.
[4] Pruvot, M., Fine, A.E., Hollinger, C., Strindberg, S., Damdinjav, B., Buuveibaatar, B., Chimeddorj, B., Bayandonoi, G., Khishgee, B., Sandag, B., Narmandakh, J., Jargalsaikhan, T., Bataa, B., McAloose, D., Shatar, M., Basan, G., Mahapatra, M., Selvaraj, M., Parida, S. and Njeumi, F. (n.d.). Outbreak of Peste des Petits Ruminants among Critically Endangered Mongolian Saiga and Other Wild Ungulates, Mongolia, 2016–2017 - Volume 26, Number 1—January 2020 - Emerging Infectious Diseases journal - CDC. *wwwnc.cdc.gov*. [online] doi:https://doi.org/10.3201/eid2601.181998.
[5] Schulz, C., Fast, C., Kore Schlottau, Hoffmann, B. and Beer, M. (2018). Neglected Hosts of Small Ruminant Morbillivirus. *Emerging Infectious Diseases*, 24(12), pp.2334–2337. doi:https://doi.org/10.3201/eid2412.180507.
[6] HAMDY, F.M. and DARDIRI, A.H. (1976). RESPONSE OF WHITE-TAILED DEER TO INFECTION WITH PESTE DES PETITS RUMINANTS VIRUS. *Journal of Wildlife Diseases*, 12(4), pp.516–522. doi:https://doi.org/10.7589/0090-3558-12.4.516.

addition to these species, antibodies to PPRV have been found in a large number of species of *Bovidae*, notably cattle[2] and buffalo[2,7], indicating sub-clinical infection (i.e. entry of the virus and its replication).

The Group noted that the current Chapter 14.7. acknowledges that cattle, camels, buffaloes and some wild ruminant species can be infected, but for the purposes of the *Terrestrial Code*, PPR is defined as an infection of domestic sheep and goats with PPRV. Therefore, Members are not obliged to report PPR cases detected in species other than domestic sheep and goats. The Group also observed that the detection of such cases does not impact the animal health status of Members already officially recognised as PPR-free by WOAH. The Group highlighted that the presence of PPRV in species other than domestic sheep and goats is most likely due to spillovers of PPRV from domestic sheep and goats and, therefore, indicative of the presence of the disease also in the domestic sheep and goat population. While current scientific evidence does not demonstrate maintenance of PPRV and re-infection from species other than domestic small ruminants back into domestic sheep and goats, the Group was of the opinion that wild ruminants and unusual hosts play a significant role as sentinels and underscored the importance of reporting of PPR cases in all susceptible species, especially taking into account the ongoing efforts according to the PPR Global Eradication Programme.

In conclusion, the Group recommended that the current definition of PPR in Chapter 14.7. be extended to include all species that develop clinical signs following infection with PPRV. While reporting of such disease is in theory covered by Article 1.1.3.1 point f, the Group felt it was important to make this explicit in this chapter, for the sake of clarity.

4. Trade provisions that make references to Chapter 8.8.

Following the adoption of the revised Chapter 8.8. 'Infection with foot and mouth disease virus' at the 91st General Session in May 2024, the Code Commission noted in two articles in Chapter 14.7., namely Article 14.7.19. and Article 14.7.25., references to articles of Chapter 8.8. that became inconsistent. The Code Commission was of the opinion that Chapter 14.7. should include all the necessary information to be 'self-sufficient' and not depend on the provisions for another pathogenic agent, in another disease-specific chapter, to avoid such inconsistencies in the future. Therefore, the Code Commission requested the PPR experts' to propose amendments as appropriate.

- <u>Article 14.7.19.: Recommendations for importation from countries or zones considered infected with PPRV for milk from sheep and goats</u>

Upon review of Article 14.7.19. and the reference to articles in Chapter 8.8. under point 1.b, the Group agreed that treatments effective against FMDV in milk may not be sufficient for inactivating PPRV due to differences in pH sensitivity and heat resistance, as an example. Drawing on unpublished data by Bill Taylor, referenced in a chapter co-authored with Paul Rossiter[8], the Group estimated the half-life of PPRV at 72°C to be approximately one minute. This calculation, based on an Arrhenius plot assuming first-order thermal decay, aligns with available data for rinderpest virus (RPV) over a greater temperature range[9,10,11]. When compiled from various sources and plotted similarly, the estimated half-life of RPV at 72°C was estimated to be 0.92 minutes (95% CI: 0.37 to 2.3 minutes). Based on these data, and given that normal pasteurisation times are less than one minute, the Group recommended removing point 1.b. from the Article and including ultra-high temperature (UHT) milk as a safe commodity in Article 14.7.2. In summary, whilst the Group did not consider the treatment mentioned in the FMD chapter sufficient to inactivate PPRV, it also noted that there are not enough studies on alternative methods to be described and left an open provision as in point 2 of Article 8.8.39.

The Group further noted that, according to Article 14.7.19. point 1.a., Members could import milk from sheep and goats from countries or zones considered infected with PPRV, provided that the milk originated from flocks which were not subjected to any restrictions due to PPR at the time of milk collection. However, the Group was of the opinion that this provision could not be considered as an effective mitigation measure providing the guarantee that the flocks were not infected at the time of the milk collection, as the animals could be infected but not yet be displaying clinical signs with subsequent notification. The Group concluded that unprocessed milk should not be traded from infected countries or zones and, therefore, recommended removing point 1.a.

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[7] Govindarajan R, Koteeswaran A, Venugopalan AT, Shyam G, Shaouna S, Shaila MS, Ramachandran S, 1997. Isolation of pestes des petits ruminants virus from an outbreak in Indian buffalo (Bubalus bubalis). *The Veterinary record*, *141*(22), 573–574. https://doi.org/10.1136/vr.141.22.573

[8] Rossiter, P. B., and W. P. Taylor. (1994). *Peste Des Petits Ruminants*, in *Infectious Diseases of Livestock with Special Reference to Southern Africa*, edited by J.A.W. Coetzer et al., Cape Town: Oxford University Press

[9] Boer, C.J. and Barber, T.L. (1964). pH and thermal stability of rinderpest virus. *Archives of Virology*, 15(1), pp.98–108. doi:https://doi.org/10.1007/bf01241425.

[10] Liess, B. and W. Plowright (1963). Studies in tissue culture on the pH-stability of rinderpest virus. *Journal of Hygiene*, [online] 61(2), pp.205–211. doi:https://doi.org/10.1017/s002217240002091x.

[11] Plowright, W. (1968). Rinderpest Virus. *Cytomegaloviruses. Rinderpest Virus. Lumpy Skin Disease Virus*, pp.25–110. doi:https://doi.org/10.1007/978-3-662-39771-8_2.

- Article 14.7.25.: Recommendations for importation from countries or zones considered infected with PPRV for products of animal origin from sheep and goats intended for pharmaceutical or surgical use

The Group discussed that products of sheep and goat origin that are usually imported for pharmaceutical or surgical use are collagen (in the form of catgut), gelatine and tallow. The Group agreed that the processes used to extract these commodities render them safe[12,13,14]. Consequently, the Group recommended deleting Article 14.7.25. and adding collagen, gelatine and tallow as safe commodities under Article 14.7.2.

The Group also considered the trade of serum. Noting that it is typically used in small quantities and has a marginal importance in terms of global trade (i.e. limited quantities and limited origins), the Group agreed that it was not meaningful to provide specific provisions.

- Article 14.7.23.: Recommendations for importation from countries or zones considered infected with PPRV for hooves, claws, bones and horns, hunting trophies and preparations destined for museums from sheep and goats

While the Group was not requested to review Article 14.7.23., the Group noted that this article contains reference to the intended use of certain commodities, which was not in line with the principles described in the 'Framework for *Terrestrial Code* Standards (disease-specific chapters), 1st edition, February 2024', according to which the end-use of the animal products imported should not be mentioned in the heading of an article. The Group concluded that the provisions under this article were sufficient to mitigate the risk of introduction of PPR through the commodities described and should apply irrespective of the intended use of the commodities. Consequently, the Group recommended removing references to intended use from Article 14.7.23. The Group also suggested expanding its scope to include wild ruminants.

5. Streamlining the annual reconfirmation procedure

The Group acknowledged the efforts of WOAH to streamline the annual reconfirmation procedure while also recognising the importance of adhering to the requirements for status maintenance in the *Terrestrial Code*. They emphasised the need for Members holding official status(es) to submit documented evidence to substantiate and maintain their PPR-free status, noting that, while certain requirements for maintaining PPR-free status may vary from one year to another, others are likely to remain consistent, with adjustments needed only in specific circumstances. Therefore, the Group distinguished between information requiring annual documented evidence to maintain a PPR-free status and information that should be declared but for which documented evidence may only need to be requested periodically or in cases of substantial change.

6. Adoption of the report

The Group agreed that the report would be subject to a short period of circulation to the Group for comments and adoption. Upon circulation, the Group agreed that the report captured the discussions.

…/Appendices

[12] Marie, A., Pickering, K.L., Waterland, M.R., Yusuf Chisti and Haverkamp, R.G. (2024). Gelatin and Collagen from Sheepskin. *Polymers*, 16(11), pp.1563–1563. doi:https://doi.org/10.3390/polym16111563.
[13] Chutima, L., Sontaya, L., Wantanwa, K., Juthaporn, P., Thanatcha, W., Pannawich, J., Phuwarin, T. and Pavisanat, P. (2021). Beef tallow: Extraction, physicochemical property, fatty acid composition, antioxidant activity, and formulation of lotion bars. *Journal of Applied Pharmaceutical Science*. doi:https://doi.org/10.7324/japs.2021.110903.
[14] Rajendran, S., Anand, S.C. and Rigby, A.J. (2016). *5 - Textiles for healthcare and medical applications*. [online] ScienceDirect. Available at: https://www.sciencedirect.com/science/article/abs/pii/B9781782424659000057.

Appendix 1 Terms of reference

AD HOC GROUP ON PESTE DES PETITS RUMINANTS

Virtual meeting, 12, 13 and 14 November 2024

Purpose

The purpose of the *ad hoc* Group is to work on selected issues under Chapter 14.7. 'Infection with peste des petits ruminants virus' of the *Terrestrial Animal Health Code* (*Terrestrial Code*) and to provide an opinion regarding the streamlining of the procedure for annual reconfirmations for the maintenance of an official PPR free status or endorsed official control programme for PPR.

Background and Responsibilities

Part 1: During its September 2024 meeting, the Terrestrial Animal Health Standards Commission (Code Commission) requested to consult expert opinion on some provisions in Chapter 14.7. 'Infection with peste des petits ruminants virus' of the *Terrestrial Code*. These include:

1. reconsideration of the role of wild animals and unusual hosts in the epidemiology of infection with PPR virus;
2. revision of provisions for imports of certain commodities of sheep and goats from PPR infected countries, and in particular the provisions under Articles 14.7.19 and 14.7.25.
3. When needed for points 1 and 2, the *ad hoc Group* should propose draft provisions for consideration by the Scientific Commission for Animal Diseases (the Scientific Commission) and Code Commission.

Part 2: According to Article 1.6.2 of the *Terrestrial Code*, Members with an officially recognised animal health status or an endorsed disease control programme by WOAH are required to submit an annual reconfirmation (AR) with supporting evidence each November to maintain this recognition or endorsement. WOAH is currently working on streamlining the process while still respecting the relevant requirements of the *Terrestrial Code* and without compromising the credibility of the WOAH procedure. As part of this work, the Scientific Commission has recommended to seek the opinion of each of the seven *ad hoc* Groups on status evaluation on the minimum supportive information they would expect Members to provide for each disease when reconfirming their animal health status annually, demonstrating compliance with the relevant requirements of the *Terrestrial Code* for maintenance of official status.

Expectations

Ad hoc Group members should:

- be familiar with the structure of the *Terrestrial Code* and the use of Glossary definitions and the Framework for *Terrestrial Code* standards;
- have read and considered Chapters 14.7. and 8.8. of the *Terrestrial Code*;
- have read all working documents provided by the WOAH Secretariat;
- contribute to discussions, and;
- contribute to drafting text for the report and, if needed, the revised articles.

Ad hoc Group members should:

- sign the WOAH Undertaking on Confidentiality;
- complete the WOAH Declaration of Interest form, and;
- read and acknowledge the WOAH personal data management policy.

Deliverables

1. a report presenting the proposed approach for the revised articles, including the rationale for decisions and proposed texts, and supporting references when relevant.
2. a draft summary (to be annexed to the report) of the minimum supportive information expected from Members to provide for PPR when reconfirming their animal health status annually.
3. the draft revised articles to be included in Chapter 14.7., as necessary.

Reporting / timeline

The above aspects will be discussed during the virtual meeting. After the meeting, the *ad hoc* Group should finalise the relevant deliverables within 2 weeks after the completion of the meeting.

Appendix 2 List of Participants

AD HOC GROUP ON PESTE DES PETITS RUMINANTS

Virtual meeting, 12, 13 and 14 November 2024

MEMBERS

Dr Michael D. Baron
Honorary Institute Fellow
WOAH Expert on Rinderpest and PPR
The Pirbright Institute,
UNITED KINGDOM.

Dr Abdelmalik Ibrahim Khalafalla
Biosecurity Affairs Division,
Abu Dhabi Agriculture and Food Safety Authority
UNITED ARAB EMIRATES

Dr Theo Knight Jones
Animal and Human Health Program
International Livestock Research Institute
ETHIOPIA

Dr Asma Kamili
Head of Animal Health Division
Direction of Protection of Animals and Plants
National Office of Food Safety
MOROCCO

Dr Zhiliang Wang
Deputy Director General
China Animal Health and Epidemiology Center
Ministry of Agriculture Qingdao
P.R. CHINA

REPRESENTATIVE OF THE SCIENTIFIC COMMISSION

Dr Misheck Mulumba
ZAMBIA

WOAH HEADQUARTERS

Dr Anna-Maria Baka
Senior Disease Status Officer
Status Department
disease.status@woah.org

Dr Sara Lysholm
PPR Status Officer
Status Department
disease.status@woah.org

Dr Bénéwendé Aristide Kaboré
Disease Status Officer
Status Department
disease.status@woah.org

Dr Su Youn Park (for Items 3 and 4)
Scientific Officer
Standards Department
standards.dept@woah.org

Appendix 3 Agenda

***AD HOC* GROUP ON PESTE DES PETITS RUMINANTS**

Virtual meeting, 12, 13 and 14 November 2024

1. Opening
2. Adoption of the agenda and appointment of Chairperson and Rapporteur
3. Role of wild animals and unusual hosts in the epidemiology of PPR
4. Trade provisions regarding the references made to Chapter 8.8.
5. Streamlining the annual reconfirmation procedure
6. Adoption of the report