The World Organisation for Animal Health - current and potential roles in safe international trade of bees and other insects

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Summary

The World Organisation for Animal Health (OIE) is the recognised intergovernmental standards setting organisation for animal health and welfare. The OIE has the mandate to support its members in the prevention of the spread of animal diseases of concern, as listed in the OIE *Terrestrial Animal Health Code (Terrestrial Code)*. Once a disease, infection or infestation is listed, national Veterinary Services have the obligation to regularly notify to the OIE the presence or absence of the listed disease.

In regard to insects, the scope of the *Terrestrial Code* limits its recommendations to preserve the health of bees (species of the genus *Apis*, extended to the genus *Bombus* and to the stingless bees for one disease). However, it does not include standards to mitigate the potential animal health risks associated to the international trade of other insects.

A description of the standards setting process and the review of the history of the standards for bee health highlights the resources and requirements to expand the scope of the *Terrestrial Code* to include recommendations for animal health risk mitigation measures for the safety of international trade in insects. On the other hand, any initiative

to develop guidance on insect trade should include the OIE in its role as the sole global standard setting organisation on animal health and welfare matters. This aligns with the OIE commitment to a One Health approach.

Keywords

Bee health – Insects – Insect health – International standards – International trade – OIE – One Health – World Organisation for Animal Health.

Introduction

The mission of the intergovernmental World Organisation for Animal Health (OIE) is improving animal health and welfare globally by drafting science-based international standards and guidelines for the prevention and control of animal diseases. The OIE standards are used by Veterinary Services to establish measures for the early detection, reporting and control of pathogenic agents that affect animal health, and for preventing the spread of those agents. Implementation of the standards ensures the safety of international trade in animals and animal products, while avoiding unjustified sanitary barriers.

The multipurpose and growing insect sector is not free from potential hazards to human, animal, or environment health (Mumford & Quinlan [1], this issue; [2]). International trade in insects and their products could pose risks for food or feed safety by carrying pathogens (e.g., Niassy *et al*. [3], this issue), impact the health of reared insects if pathogenic agents are introduced to the destination country and its colonies, affect native insect populations (e.g., Goka [4], this issue), or affect crops or biodiversity by the introduction of invasive species of insects to new territories [5]. Intellectual property considerations (Kumar *et al.* [6], this issue) and moral issues on exotic or endangered insect displays (Saul-Gershenz [7], this issue) are also increasingly important to stakeholders, alongside these animal health and ecological concerns. Therefore, preserving the health of insects, both reared and wild, by implementing science-based risk mitigation measures is an

integral part of good animal, human and environmental health management, food security and enhanced global agriculture.

As far as insect species, the OIE provides recommendations for the control of diseases of bees (species of the genus *Apis*, extended to the genus *Bombus* and to the stingless bees for one disease: small hive beetle). Veterinary Services and other key players in the beekeeping sector are requested to implement the OIE risk management recommendations relating to the trade of live bees and their products. However, the OIE does not currently provide recommendations to mitigate animal health risks associated to the international trade of insects other than bees. Therefore, it is important to identify if other appropriate international and national regulatory frameworks based on the latest science are sufficient to protect animal health, or additional guidance is required.

The OIE supports policymakers and governments in creating a future where humans and animals benefit from a more sustainable ecosystem balance in which bees and other insects play a significant role. As part of this special edition, colleagues from a range of institutions and experience have provided ideas on how to proceed [8, 9].

The purpose of this paper is to describe the OIE's mandate in setting international standards for animal health and welfare, and also to describe the process of including bee health standards in the *Terrestrial Code*, which establishes the level of commitment that would be required before expanding the scope of the *Terrestrial Code* to new technical areas such as animal health aspects of insect trade.

The World Organisation for Animal Health International Standards

The role of the OIE as the international standard-setting organisation for animal health and zoonotic diseases is recognised by the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), 15 April 1994 (1867 UNTS 493, WTO Doc LT/UR/A-1A/12). The OIE international standards are based on the most recent scientific and technical

information and provide both general and disease-specific recommendations for the improvement of animal health and welfare and veterinary public heath worldwide. The OIE international standards for terrestrial animals are developed by three dedicated Specialist Commissions: the Terrestrial Animal Health Code Commission, the Scientific Commission for Animal Diseases, and the Biological Standards Commission. The globally recognised expert members of these Specialist Commissions are elected by the World Assembly of OIE Delegates and have a three-year mandate.

The standard-setting process normally involves a cycle of two years. It is triggered by the identification of issues that affect global animal health or welfare. Requests for the revision of existing standards or for the development of new standards can be made by various entities including OIE Delegates who represent OIE Member (countries or territories), international and regional organisations that have official cooperation agreements with the OIE, and experts from OIE Working Groups, Collaborating Centres, or Reference Laboratories.

The process generally begins with the work of *ad hoc* Groups of experts that are formed for limited periods of time with very specific terms of reference. The OIE Director General has the mandate to convene the *ad hoc* Groups and to select the experts based on their experience and scientific excellence while ensuring geographical balance. The members of *ad hoc* Groups are mostly selected from the global network of OIE Reference Centres, or relevant OIE Working Groups. The *ad hoc* Groups assess potential risks and also provide risk management recommendations. The experts discuss current scientific knowledge and evaluate existing risk mitigations. *Ad hoc* Groups' recommendations are considered by the OIE Specialist Commissions, and their reports are published on the OIE website.

The main responsibility of Specialist Commissions in this process is to ensure the proposed standards are based on the latest scientific evidence, and that the recommendations are feasible and likely to be accepted and enforced by both public and private sectors. OIE Members as well as organisations with which the OIE has formal cooperation

agreements are invited to submit comments to Commissions' proposals. In addition, they are encouraged to provide the scientific rationale for their comments, to facilitate subsequent analysis by Specialist Commissions. This commenting process helps ensure that the OIE international standards are both evidence-based and consensual.

The World Assembly of OIE Delegates at their annual General Session discusses, votes, and when a consensus is reached, adopts the new or amended standards. The adopted international standards are then published in the OIE *Terrestrial Code* [10] or the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* (*Terrestrial Manual*) [11]. The *Terrestrial Code* includes the standards on disease control and safe international trade, and the *Terrestrial Manual* contains the standards for diagnostic laboratory methods and, when relevant, requirements for the production and control of vaccines and other biological products.

The *Terrestrial Code* maintains a list in Chapter 1.3. [12] of diseases, infections and infestations for which the notification obligations of Chapter 1.1. [13] apply. Transparent, timely, and consistent notification supports OIE Members by providing the information needed to take appropriate action to prevent transboundary spread of those diseases. Importantly, Chapter 1.2. [14] outlines the criteria for inclusion of diseases, infections, and infestations in the OIE list.

Once new or amended OIE international standards are published, OIE Members are required to incorporate them into their national legislation and enforce them. With regards insects, mites, and ticks, the *Terrestrial Code* [10] includes recommendations for the control of vector-borne diseases such as bluetongue (Chapter 8.3.) [15], epizootic hemorrhagic disease (Chapter 8.7.) [16], African horse sickness (Chapter 12.1.) [17], lumpy skin disease (Chapter 11.9.) [18], Rift Valley fever (Chapter 8.15.) [19] or infection with *Trypanosoma brucei, T. congolenges, T. simiae* and *T. vivax* (Chapter 8.18.) [20]. The *Terrestrial Code* Chapter 1.5. [21] covers the standards on surveillance for arthropod vectors of animal diseases. In addition, section 9 'Apidae' includes six chapters dedicated to bee diseases, infections, and infestations (see below).

It is worth noting that the *Terrestrial Code* does not list all insect vectors of notifiable diseases relevant to animal health. The focus of the standards is vector borne disease management and safe international trade by avoiding having individual risk animals or their products enter the value chain. Certainly, the *Terrestrial Code* does not include provisions on intentional transport of the vector species, for example for research or sterile insect programmes.

The OIE International Standards relevant to bee health

The first OIE bee health standard was adopted by the World Assembly of OIE Delegates in 1947. Although primarily related to the control of acarapisosis, it also recommended that OIE Members extend control measures to other transmissible bee diseases. In 1956, OIE Delegates set up a permanent Specialist Commission on the pathology of bees. This Commission worked in close cooperation with relevant international organisations and experts on scientific and policy issues. Its activities included: harmonisation of national sanitary policies for the importation and exportation of bees, brood combs and bee products; harmonisation of national sanitary policies for the control of bee diseases; providing recognised diagnostic test methods and protocols for the treatment of bee diseases; and developing the means to maintain the safety of bee products, especially honey for human consumption (note that this last issue is now managed by the Codex Alimentarius, a collection of international standards, guidelines and codes of practice to protect the health of consumers and ensure fair practices in the food trade). The Commission organised regular conferences and symposia on topics related to bee health and management and met at least once per year from 1957 to 1982, at which time it was discontinued owing to reorganisation of the OIE Specialist Commissions. Since then, recognising the importance of bee health for food security and the role of bees as pollinators [22], and in cooperation with other relevant international organisations, the OIE and its Members have continued their work on improving bee health and fighting bee diseases.

The 2021 edition of the *Terrestrial Code* [10] lists six entries in Chapter 1.3. [12] in the category of bee diseases, infections, and infestations, and includes topics relevant to bee health in eight other chapters:

- Chapter 4.15. [23] 'Official health control of bee diseases '. This chapter describes how the official health control of bee diseases should be organised at the national level. It emphasises the fundamental responsibilities of the Veterinary Authority for the surveillance and control of bee diseases with the support of beekeepers.

- Chapter 5.10. [24] 'Model veterinary certificates for international trade'. This chapter provides a model certificate for international trade in products of honey bee origin and in bees and brood combs.

- Chapters 9.1. to 9.6. cover the six bee diseases listed by the OIE and for which OIE Members are required to regularly notify the OIE of relevant epidemiological information to minimise the spread of those diseases. These chapters are: 'Infestation of honey bees with *Acarapis woodi'* (9.1.) [25] , 'Infection of honey bees with *Paenibacillus* larvae (American foulbrood)' (9.2.) [26], 'Infection of honey bees with *Melissococcus plutonius* (European foulbrood)' (9.3.) [27], 'Infestation with *Aethina tumida* (small hive beetle)' (9.4.) [28], 'Infestation of honey bees with *Tropilaelaps* spp.' (9.5.) [29], and 'Infestation of honey bees with *Varroa* spp. (Varroosis)' (9.6.) [30]. These chapters assist Members to harmonise their efforts to detect, prevent, and control disease, and provide standards for safe international trade of bees and their products.

In addition to chapters dedicated to the six listed diseases of bees, the 2021 edition of the *Terrestrial Manual* [11] includes Chapter 3.2.4. [31] 'Nosemosis of honey bees'.

The OIE regularly updates the *Terrestrial Code* and *Terrestrial Manual* chapters through the relevant Specialist Commissions and with the support of internationally recognised experts. For example, the revised

Chapter 9.4. 'Infestation with *Aethina tumida* (Small hive beetle)' of the *Terrestrial Code* was adopted in May 2021 by the World Assembly of OIE Delegates. The revision was initiated in response to OIE Member concerns on the recommendations for the importation of individual consignments containing a single live queen bee, accompanied by a small number of associated attendants. Similarly, in response to a request by a OIE Reference Laboratory, the OIE commenced assessment of whether 'Infestation of honey bees with *Acarapis woodi*' and 'Infestation of honey bees with *Tropilaelaps* spp.' still meet the criteria for inclusion in the OIE list. At the time of writing, this assessment is progressing according to OIE's *Standard Operating Procedure for listing decisions for pathogenic agents of terrestrial animals* [32].

Current scope of the OIE *Terrestrial Code* for insects and their products

The *Terrestrial Code* contains a Glossary [33] defining key terms and expressions that are used in more than one chapter and for which common dictionary definitions are not deemed adequate for the correct interpretation of the term or expression in the context of the OIE International Standards. *Italicised text* is used in the *Terrestrial Code* to indicate that the terms or expressions have been defined in the Glossary.

For the purposes of the *Terrestrial Code*, an *animal* is defined as 'a mammal, reptile, bird or bee'. In consequence, live insects other than bees are not considered as animals and current OIE standards do not apply to the international trade of live insects other than bees.

The Glossary defines *commodity* as 'live *animals*, products of animal origin, animal genetic material, biological products and *pathological material*'. As '*animals'* in 'live *animals'* is italicised, its scope is restricted to live mammals, reptiles, birds, or bees. In contrast, 'animal' in 'products of animal origin', is not italicised, and consequently, can refer to a broader definition of animals. Therefore, in this context and for the purposes of the *Terrestrial Code*, the Glossary definition for *commodity* may be interpreted as including products derived from insects, such as insects processed for food or feed. Similarly, the

Glossary definition for *feed ingredient* includes a non-italicised reference to 'animal', so may also be interpreted to encompass insect products that can be fed to animals.

Historically, the mandate of the OIE covering feed and food safety was limited to addressing animal feed as a pathway for the introduction or spread of contagious epizootic diseases (e.g., foot and mouth disease or African swine fever). However, in 2006 it included the development of guidance on foodborne zoonoses and safe animal feeding, complementing relevant Codex Alimentarius texts (e.g. CAC/RCP 54-2004 and CAC/RCP 49-2001). The *Terrestrial Code* Chapter 6.4. [34] provides guidance on animal feeding in relation to animal health and was first adopted in 2009 and last updated in 2011. It applies to the production and use of all products destined for animal feed and feed ingredients at all levels whether produced commercially or on farm. It does not explicitly refer to insects as feed ingredients, but the general principles and definitions described in the chapter should apply to the production and the use of products derived from insects for animal consumption.

Discussion

Despite the large volume of trade in live insects outlined in this special edition and the fact that insects play such a vital role in the global ecosystem, there is no clear framework regulating the health of insects entering trade. A significant change to the current scope of the *Terrestrial Code* would be required to enable the OIE to provide recommendations for preserving the health of insects other than bees. This would require parallel discussions and decisions about the role of Veterinary Services in insect health, and may require consideration of the inclusion of insect health in the veterinary undergraduate or postgraduate curricula.

A number of insect and other arthropod species act as vectors capable of transmitting human [35] or animal [36] diseases, which could be under the mandate of OIE. The international trade of insects could contribute to transboundary spread of insect species, their diseases, and insect and vector borne diseases of humans, animals, and plants (as

recognised under other international frameworks). Accurate assessment of the potential risk posed by international trade of insects and their products is required to determine appropriate risk mitigation measures while avoiding imposition of unjustified barriers to trade. To assess the risks and facilitate the development of appropriate international recommendations, a better understanding is required of the global value chain for insects, including species traded, countries and sectors involved, purpose of trade, and the associated risks for human, animal, or environmental health. Given the broad scope of the potential animal and human health and ecosystem issues associated with the international trade of insects and their products, a collaborative, multisectoral, One Health approach [37] will be needed to effectively understand and manage any potential risk.

The development of standards or guidelines for the international trade of insects and their products requires clarification and agreement of the roles and responsibilities of key actors in the safe international trade in insects. These comprise public and private organisations and bodies, including (but not limited to): Codex Alimentarius, Convention on Biological Diversity, Food and Agriculture Organization of the United Nations, International Plant Protection Convention, United Nations Environment Programme, World Health Organization, World Organisation for Animal Health, International Organization for Standardization, and World Trade Organization. The OIE 7th Strategic Plan (2021–2025) considers the need to adapt to a changing world and recognises the need for continuing to develop scientifically based standards and guidelines for the management, control, or eradication of diseases at the animal-human-environment interface, taking into account economic, social, and environmental factors. The OIE's standard-setting process and the experience gained by the OIE and its Members in the development and implementation of international standards for bee health and for food and feed safety could be used as a model to review, update, or develop new standards and guidelines to manage the animal health risk risks associated with the international trade of insects and their products, to the extent that these issues are not already covered by other instruments (see Quinlan *et al*. [38], this issue).

Conclusions

Maintaining a healthy insect sector and safely trading insects and their products internationally is a One Health challenge that merits the full attention of the global scientific and regulatory community. The public and private sectors, including Veterinary Services, should collaborate to find the best practices for ensuring safe international trade of insects and their products, and agree on their roles and responsibilities.

With its experience and consistent with its mandate, the OIE is well placed to discuss, with other international organisations and the private sector, the need to develop guidance or standards or review existing guidance for safe international trade of insects and their products. However, developing specific recommendations for evaluating and preserving the health of insects entering trade, other than bees, would require changes to the current scope of the OIE international standards and substantial resources.

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