Int.J.Curr.Res.Aca.Rev.2024; 12(9): 79-90

EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 (Online) Volume 12 Number 9 (September-2024)

Journal homepage: http://www.ijcrar.com

doi: https://doi.org/10.20546/ijcrar.2024.1209.010

Qualitative Risk Assessment for the Introduction of Avian Infectious Bronchitis Virus from Dutch Netherlands to Ethiopia via Importation of Bovans Poultry Breed

Begidu Tesfaye Mune, Tariku Geinoro Alleyo*, Eliyas Gezahegn Deksisa and Midekso Sankuro Gaguro

Hawassa University Faculty of Veterinary Medicine, Hawassa, Ethiopia

**Corresponding author*

Abstract

This qualitative risk analysis considers the avian infectious bronchitis risk associated with the importation the Bovans brown poultry breeds from Dutch Netherland to Ethiopia by Ethiochicken Company. Introduction of the poultry has been intended for commercial breed purposes. AIBV is a highly contagious disease of poultry with high economic importance. Caused by avian infectious bronchitis virus, it is transmitted by direct and indirect contact through aerosol or fecal means and considered as respiratory disease. The agent acquaint with, charming established and dispersion among poultry breed danger to importing country. The risk assessment was conducted for 7 weeks and together with the likelihood magnitude of potential consequences for animal health and production. The result on risk assessment show the commodity was non-negligible and estimated as very high for IBV in poultry and need actual risk controlling serviceable. The strategies of mitigation and management according universal acceptance rules and interferences, the risk management possibilities argued in this paper comprise:- Birds showed no clinical sign of avian infectious bronchitis up to 50 days, on the day of shipment and based on the chickens tested for infection results of serological tests transported with international veterinary certificate (OIE, 2022); According to OIE (2022), birds could be randomly tested using virus detection or isolation serological methods, the frequency of testing should be based on the risk of infection; During shipment, using historical information or information from appropriately verified and validated epidemiological models to identify low risk ports and transport routes (OIE, 2022); Chicken should be transported to Ethiopia in uncontaminated, idle package, appropriately sanitized containers and risk free safe shipment also full filed requirement standards documented in the OIE Terrestrial Animal Health Code (OIE, 2022); The introduced parent stock should be kept under secure quarantine areas in Ethiopia and a sample of stock tested for *Avian Infectious Bronchitis Virus* prior to distribution.

Article Info

Received: 10 July 2024
Accepted: 24 August 2024
Available Online: 20 September 2024

Keywords

Avian, Bovans brown, Dutch, Ethiopia, Infectious bronchitis, Risk assessments.

Introduction

Poultry production has paramount socioeconomic importance in Ethiopia through the provision of eggs and meat which support food and nutrition security at household, regional, and national levels. Moreover, it serves as a source of cash income for about 80% of the Ethiopian population (Shapiro *et al.,* 2015). The importation of Poultry and Poultry products involves a certain level of disease risk to the importing country. This risk may be represented by one or several diseases, infections or infestations (OIE, 2019). Poultry viral disease among the most frequently occurring pathogens, especially in Ethiopia. Exotic breeds are becoming more

and more commonly raised, thus there is higher host susceptibility. This is considered to complicate the scenario, together with the possible pathogen introduction along with the new breeds (Mazengia, 2012).

Importation of poultry plays a great role in the introduction of disease into Ethiopia, in which exotic chicken were associated with outbreaks of the disease (Getiso *et al.,* 2017; Megerssa *et al.,* 2016). Infectious Bronchitis Virus (IBV) is possibly the most economically important viral respiratory disease of chicken after Avian Influenza (AI) and Newcastle disease (NCD) (Cavanagh, 2005).

Infectious Bronchitis Virus (IBV) is an acute and highly contagious respiratory pathogen of chicken that has a major economic impact on poultry stakeholders. As a consequence of the severity and highly contagious nature of IBV infection, it has been implicated in higher economic loss in breeders and layer chickens attributed to reproductive disorders and renal dysfunction (Zhang *et al.,* 2020). Poultry of all ages can be infected by Infectious Bronchitis Virus (Barua *et al.,* 2006).

Infectious Bronchitis Virus classified as a list A disease by the World Animal Health Organization, Office International des Epizooties, (OIE) because of the severity and highly contagious nature of IBV infection, it has been implicated in higher economic loss in breeders and layer chickens (OIE, 2012).

The principal aim of import risk analysis is to provide importing countries with an objective and defensible method of assessing the disease risks associated with the importation of animals and animal products. This is necessary so that the exporting country and all interested parties are provided with clear reasons for the imposition of import conditions or refusal to import (OIE, 2019).

This risk inquiry conceded on Infectious Bronchitis Virus. Disclosure imitation by the importation of Bovans poultry breed from Dutch Netherland to Ethiopia. The company Ethio-chicken imports and disseminated Bovans brown poultry breed a commercial layer purely for commercial egg production to the farmer and user and smallholder farmers within Ethiopia.

Objectives the document

The qualitative risk assessment's intention, hence considering the severity and highly contagious nature of IBV infection the economic importance of the disease in poultry especially in importing country the document accompanied with the aim that includes to investigate and analyze risk of IBV by importing Bovans poultry breed from Dutch Netherland to Ethiopia and measure and know exporting country circumstances about the hazard. To Offer how risk possibilities for the management of hazard object has been gauged and controlled before generate damage. And also provide recommendations and create awareness about consequence supplies of imperviousness gratitude of live hosting poultry's.

Commodity Definition

Bovans Brown Poultry breed

The Bovans brown breed (BBB) genetics are one of familiar exotic breed in Ethiopia, which are owned by Ethio-chicken. The breed is a white egg layer designed to best meet the challenges of today's modern egg industry; producing very large quantities of uniformly sized strong-shelled eggs at a very low feed conversion ratio (CPI, 2012).

The breed, formerly known as BovansGoldline and is a hybrid of Rhode Island Red (cock) and Light Sussex (hen) imported from Dutch. Ethio-chicken produces quality day-old chicks, affordable feed, and provides robust management training for rural farmers, thereby driving gains in productivity. The company has produced an advanced, economically viable, and replicable distribution model to bring chicks, feed, and training to smallholder farmers within Ethiopia and are exporting to other African countries.

Birds obligate to be transported and dispensed to the farmer and customer in personnel involved in the catching of animals, should be adequately trained in bird handling and basic biosecurity procedures. To minimize stress, poultry should be transported in well ventilated containers and should not be over crowded. Exposure to extreme temperatures should be avoided. Containers should be cleaned and disinfected between each use, or disposed of in a safe manner according with OIE Terrestrial Animal Health Code dominant (OIE, 2015; OIE, 2019; OIE, 2022).

Materials and Methods

The risk assessment methodology was investigations grounded on the guidelines in import risk analysis of

World Organization for Animal Health Volume-II, Section 10. Chapter 10.2 Article 10.2.2. Recommendations are applicable to OIE listed diseases Terrestrial Animal Health Code frame work (OIE, 2022).

Risk Questions

- ✓ Import countries free? How is the status of Ethiopian Friskiness?
- ✓ What is the risk of introduction of IBV in to Ethiopia via importation of infected poultry from Dutch Netherlands?
- ✓ What is the likelihood establishment of IBV and risk of other susceptible hosts through interaction or sentient poultry in Ethiopia?
- ✓ What is the risk of IBV infection of all poultry and possibility of transmission to local breeds of chickens?

Risk Communication

Risk communication is the interactive transmission and exchange of information and opinions throughout the risk analysis process concerning risk, risk-related factors and risk perceptions among risk assessors, risk managers, risk communicators, the general public and other interested parties (OIE, 2022; OIE, 2021). It is a multidimensional and interactive process and should ideally begin at the start of the risk analysis process and continue throughout (OIE, 2015).

A risk communication strategy should be put in place at the start of each risk analysis and it was conducted for **7** weeks of public argument to validate the systematic footing of the risk assessment. The communication of the risk should be an open, interactive, iterative and transparent exchange of information that may continue after the decision on importation. The assessment outcome was offered on consultative conference that conveyed diverse participants collected plus mutually in community and private subdivisions and the meeting take-up at Central Hotel, Hawassa, Sidama, Ethiopia.

The principal participants in risk communication include the authorities in the importing country and other stakeholders such as domestic and foreign industry groups, domestic poultry producers and consumer groups also, stakeholders involving from Ethio-chicken officials, Livestock and Fisheries Executive, Veterinarians and animal health services, Ministry of Trade, small scale and large scale poultry production, Ministry of Agriculture, small scale chicken rearing farmers, Research Organizations, Academia, Broadcasting and other regarding organizations. The assumptions and uncertainty in the model, model inputs and the risk estimates of the risk assessment communicated. Peer review is a component of risk communication in order to obtain scientific critique and to ensure that the data, information, methods and assumptions are the best available.

Following this passé of community conference on this current manuscript, a review of submissions will be produced and a decision-making committee will determine whether any changes need to be made to this draft risk analysis. A draft manuscript released for **7** weeks period, imports health, participant suggestions in virtual to the current imports health standards are revised formerly. Finally, risk analysis was assigned.

Preliminary Hazard List

The hazard identification involves identifying the pathogenic agents which could potentially produce adverse consequences associated with the importation of poultry from Dutch Netherland. Several categories of potential biotic hazards connected with incoming trade and transportable.

Thus, the threat kindness progression originates with the gathering of a list of organisms possibly associated with the product. Biotic entity, biochemical agent and station of Distributing state to be danger for receiving country through indication just about chicken eminence are organized from diverse centers and systematized as follow.

Scenario Tree Showing the Pre-Assessment of the Risk

Scenario tree

Scenario tree is perpetual unceremonious applicable elusive outline and descriptive exhibition showing biological hazard pathways to configuration a hazard impact being obtainable in to an introducing country. The condition showing the pathways measured in a humble, apparent and substantial system.

Hazard Identification

Hazard identification is a categorization step identifying biological agents dichotomously as hazards or not hazards. The evaluation of the veterinary services, surveillance and control programmers and zoning and compartmentalization systems are important inputs for

assessing the likelihood of hazards in exporting country (OIE, 2019). The hazards identified would be those appropriate to the species being imported, or from which the commodity is derived, and which may be present in the exporting country (OIE, 2015).

To be identified as a hazard, the pathogenic agent accordingly OIE Code

Infectious bronchitis virus (IBV) is classified as a *list A* disease by the World Animal Health Organization, Office International des Epizooties, (OIE) it included in notifiable Diseases, Listed under AVES in Section 10, Chapter 10.2, Article 10.2.1, Under category of avian diseases of the OIE Terrestrial Animal Health Code (OIE, 2022).

Avian infectious bronchitis (IB) is a highly contagious respiratory infectious disease hazardous to the poultry industry. It can infect chickens at all (Cavanagh, 2007; Abd *et al.,* 2009). In the survey of 176 countries, avian infectious bronchitis is ranked as a disease with the second largest loss of poultry life after Highly Pathogenic Avian Influenza (HPAI) (OIE, 2011). It is a major cause of economic loss to the poultry industry (Ramakrishnan and Kappala, 2019).

Etiology of Disease

Infectious bronchitis major viral disease of poultry, that causes respiratory infections. It caused by avian infectious bronchitis virus (IBV). Its taxonomic classification is order Nidovirales, family Coronaviridae, genus Gammacoronavirus, and species avian coronavirus (Meir, 2010).

IBV is an enveloped virus with a single-stranded positivesense RNA genome. Four structural proteins (spike (S), envelope (E), membrane (M), and nucleo-capsid (N)) were encoded by the IBV genome (Cavanagh, 2007)**.**

Spikes protein gives the virus a crown-like appearance so the name corona. Glycoprotein is contains epitopes for neutralizing and serotype-specific antibodies (Masters, 2006). The virus has more than 30 serotypes and dozens of variants (Zanella *et al.,* 2003). The most prominent are highly virulent IBDV (vvIBDV) including strains Dutch type (D146, 793B also Massachusetts type (M41), the prototype IBV and Connecticut (Conn strain) (Jungherr *et al.,* 1956).

Determination of Ethiopian Status

Ethiopia, the private and public large scale intensive poultry farms are mainly dependent on the import of chicks from abroad. Country like Dutch Netherlands, Saudi Arabia, Egypt, UK, Germany, and Kenya (Dawit *et al.,* 2009). 18 IBDV is an emerging disease in Ethiopia, and it was detected in 2002 for the first time (Zeleke *et al.,* 2005). The virulent IBDV (vvIBDV) strains are circulating in Ethiopia (Mazengia, 2012)

Four serotypes of infectious bronchitis virus were identified from backyard and commercial farms in Ethiopia, namely M41 (GI-1), D-274 (GI-12), 793B (GI-13) and QX (GI-19) (Tegegne *et al.,* 2020). Reported show that IBDV has spread to other parts of the country (Bekele *et al.,* 2005). In Ethiopia, Hutton *et al.,* (2017) revealed the presence of the 793B genotype in commercial chicken farms with high (94.5%), also seroprevalence report M41, D-274, 793B, and QX serotypes, with a prevalence of 74.88% and 68.75% in the unvaccinated backyard and commercial farms, respectively (Tesfaye *et al.,* 2019).

Epidemiology of a disease

Infectious bronchitis disease was first observed in 1930 in the North Dakota, United States (Beach and Schalm, 1936). Egypt identified the IB variants illustrations closely related to Dutch variant D3128 and Mass variant (Sheble *et al.,* 1986). Various IBV serotypes were first identified in 1956 (Jungherr *et al.,* 1956)7. In the survey of 176 countries, IB is ranked as a disease with the second largest loss of poultry life (OIE, 2011). Different variants of IBV have been reported worldwide as an ongoing problem or as a periodic outbreak. The virus has more than 30 serotypes and dozens of variants (Zanella *et al.,* 2003).

Novel IBV variants in Nigeria and Niger which were antigenically and genetically distinct from other known IBVs (Ducatez *et al.,* 2009). Important strains of IBV, i.e. 793B or QX that have been found over Asia and Europe (Wang *et al.,* 1998; Worthington *et al.,* 2008). Pathogenic strain like D146 reported only in Dutch Netherland and Western Europe. (Wu *et al.,* 1998).7 In China, a total of nine different genetic groups has been recognized: LX4, LDT3, LHLJ, BJ, LDL, N1/62, and LSC as well as Mass- and 793B-type viruses (Han *et al.,* 2011). In 2004, a study suggested that Asian variants are recombinant, derived from Dutch Netherland and Australian strains (Shieh *et al.,* 2004).

Transmission

IBV has a short incubation period (IP) of about 18-36 hours. IBV is transmitted by air through inhalation and ingestion of infectious virus particles and direct contact; and indirect transmission occurs through aerosol droplets or feces, exposure to fomites containing virus such as clothing, shoes, tools, etc. Aerosol transmission is a significant mode of transmission during the first 3–5 day (De Wit, 2000). Also transmitted through infected semen, uric acid and feces (Gallardo *et al.,* 2011). 7 Airborne transmission mainly occurs through aerosol, in droplets expelled during coughing or sneezing by the infected and Spread of the disease through a flock is very rapid (Dhama *et al.,* 2004).

Clinical Signs

IBV, Clinical signs include coughing, sneezing, râles, nasal discharge, and frothy exudate in the eyes. Affected chicks appear depressed and will tend to huddle near a heat source. In an affected flock, all birds will typically develop clinical signs within 36 to 48 hours. Decreases egg production, degrades egg shell quality, and renders less hatchability and poor body weight gain and poor FCR in broiler (Cavanagh, 2005).

OIE Recognition

Infectious bronchitis virus (IBV) is included in the OIE list **A** notifiable Diseases, Listed under AVES in Section 10, Chapter 10.2, Article 10.2.1, Under category of avian diseases of the OIE Terrestrial Animal Health Code (OIE, 2022). Comprehend recommendations for the import of poultry to minimize the likelihood of introducing virus (OIE, 2019).

Hazard Identification Conclusion

Avian infectious bronchitis (IB) is a highly contagious respiratory infectious disease hazardous to the poultry industry. It can infect chickens at all ages and replicates in many tissues (Cavanagh, 2007; Abd *et al.,* 2009). 21 pathogen strain D146 reported in Dutch Netherland and Western Europe (Wu *et al.,* 1998). 7 the highly virulent IBDV (vvIBDV), strainstype (M41), IBV- group III, 793B or QX, Arkansas strain of IBV views considered to obligate the probable major hazardous risk to the importing country.

In conclusion: Avian infectious bronchitis disease hazardous to the poultry industry. Therefore, all strains of highly virulent IBDV (vvIBDV) and its strains D146, 793B also M41 are classified as potential risk or hazards in the commodity.

Risk Assessment

The risk assessment is the component of the analysis which estimates the risks associated with a danger **(**OIE, 2019**)** and alsoIt is the evaluation of the likelihood and the biological and economic consequences of entry, establishment and spread of a hazard (OIE, 2021**).**

Entry (Release) Assessment

Entry assessment consists of assessing, through consideration of the likelihood that the IBDV agent has either been introduced into the country, zone or compartment via commodities potentially contaminated with it, or is already present in the country, zone or compartment **(**OIE, 2022**).** It describing the biological pathways necessary for an importation activity to introduce pathogenic agents into a particular environment **(**OIE, 2019**).**

Chicken is the primary host but the virus is also reported in pheasants and peafowl (Smith *et al.,* 1985). Birds of all age and breed are susceptible but the severity is high in younger chicks with mortality between 15-90 %.

Virus transmission occurs through various routes including inhalation and through direct contact (Dhinakar and Jones, 1997). 7 Low biosecurity standards contribute to the spread of IBDV with risk factors owning rural birds and vendor vehicles aggravating the transmission of the virus (Tulu, 2019).

Therefore, all strains of highly virulent IBDV (vvIBDV) including strains D146, 793B also M41 are classified as potential risk or hazards in the commodity. The Entry (Release) Assessment estimation to be *sufficient/moderate.*

Exposure Assessment

Exposure assessment consists of describing the biological pathways necessary for exposure of animals in the importing country to the hazards. The probability of specified exposure conditions with respect to amounts, timing, frequency, duration of exposure, routes of exposure, such as ingestion, inhalation (OIE, 2022).

Since IBV has a short incubation period (IP) of about 18-36 hours. It is transmitted by air through inhalation and ingestion, direct and indirect transmission occurs through exposure to fomites containing virus such as clothing, shoes, tools, etc. (De Wit, 2000). 7 Depending on ubiquities fauna and highly contagious property the potential hazards introduced in commodity and consequence in Introduction of domestic and wild avian in importing country. Consequently, the e*xposure assessment* for all strains of highly virulent IBDV (vvIBDV) is dignified to be non-negligible and the probability is estimated to be very high**.**

Table.1 List of Biological, chemical agent conceivably risk for importing commodity

No.	Biological Danger (Treat)	Cause/Ethology	Dutch Netherland station	Hazard Chemical ty	Risk?
1	Avian Infectious Bronchitis Virus	*Bronchitis Spp*	Present, **Possible Hazard**	Heavy Metals (Arsenic, Cadmium)	Yes
2.	Avian influenza (AI)	*Orthomyxovirus*	No, not presnt at a time	olychlorinated biphenyls, chlorine	Yes
3.	Avian orthoavulavirus	*Orthoavulaviru*	Present, prevalence unknown	Aldehydes and Perfluor-alkylated	Yes
4.	*Avian leukosis*		No	*All necessary vaccines*	Yes
5.	Avian Campylobacterisosis	*Campylobacter Jejuni*	No	Nitarsone, and carbarsone	Yes
6.	Mycoplasma gallisepticum	Mycoplasma Spp.	Present, but uncommon	Feed and its ingridients	Yes
7.	Mycoplasma synoviae	Mycoplasma Spp	unknown	Formaline	Yes
8.	Salmonella GallinarumPullorum	*Salmonella Spp.*	prevalence unknown	Peroxides	Yes
9.	Infectious Bursa Disease	*Gumboro Disease*	Unknown, no surveillance	Roxarsone	Yes
10.	Avian toxoplasmosis	toxoplasmosis	Unknown	Others which has contact with poultry	Yes

Sources*:* Desta and Hiwot, (2020); Dutch Product Boards for Livestock (2013), OIE, (2019); OIE, (2013); Alexander, (2003);https://www.id-vet.com/wp.../Poultry-product-list-ELISA-PCR2019-v1doc9254.pdf,***https://www.intechopen.com/chapters/52046**

Table.2 Combined matrix tables show probabilities of entry, exposure and consequence

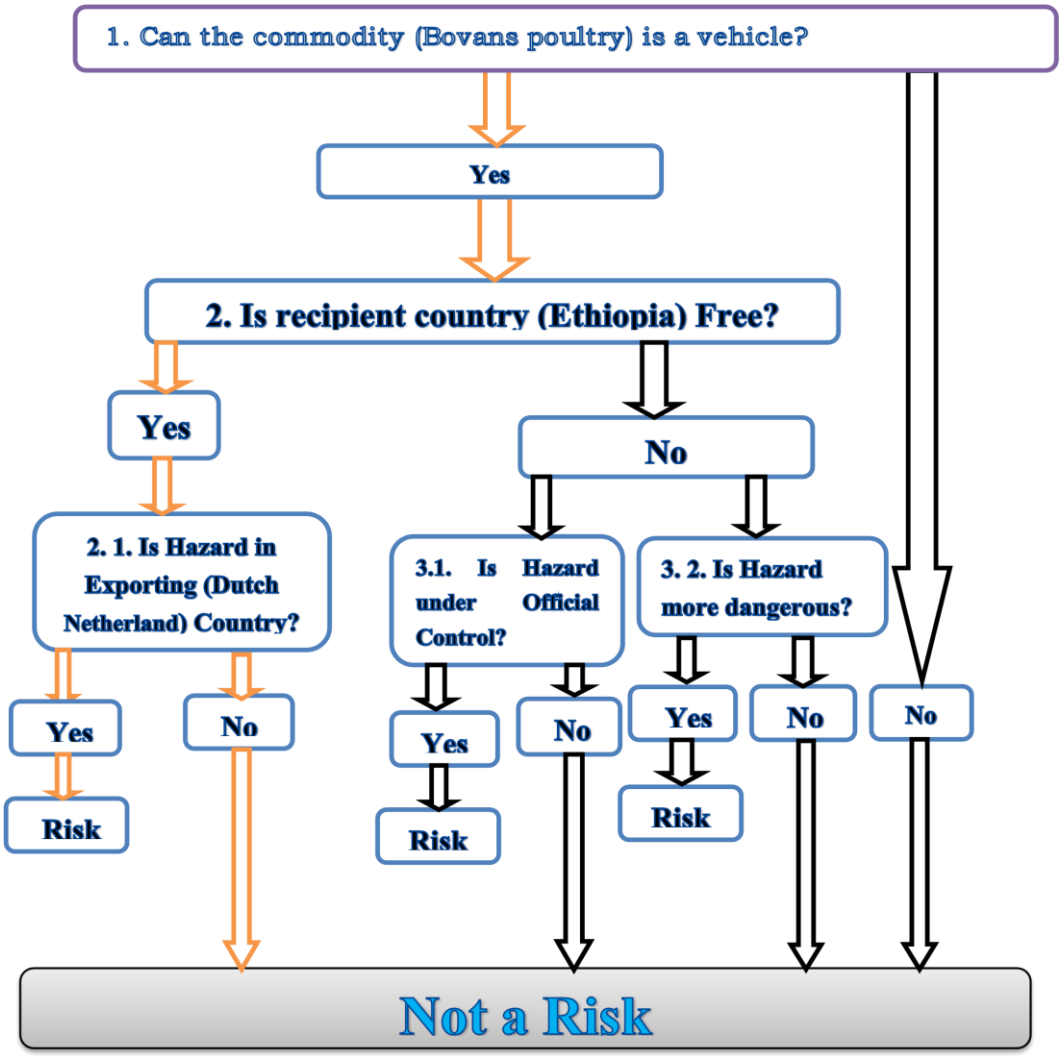
Risk Agent	**Probability of entry**	**Probability of Exposure**	**Consequences**
Avian Infectious Bronchitis IBDV (vvIBDV)	*Sufficient/ Moderate.*	Very high	Very high

	Probability of Exposure			**Consequences**		
	Probability of entry	*Sufficient/ Moderate.*	High	Probability of entry and exposure	High	Very high

Figure.1 Bovans Brown poultry breed

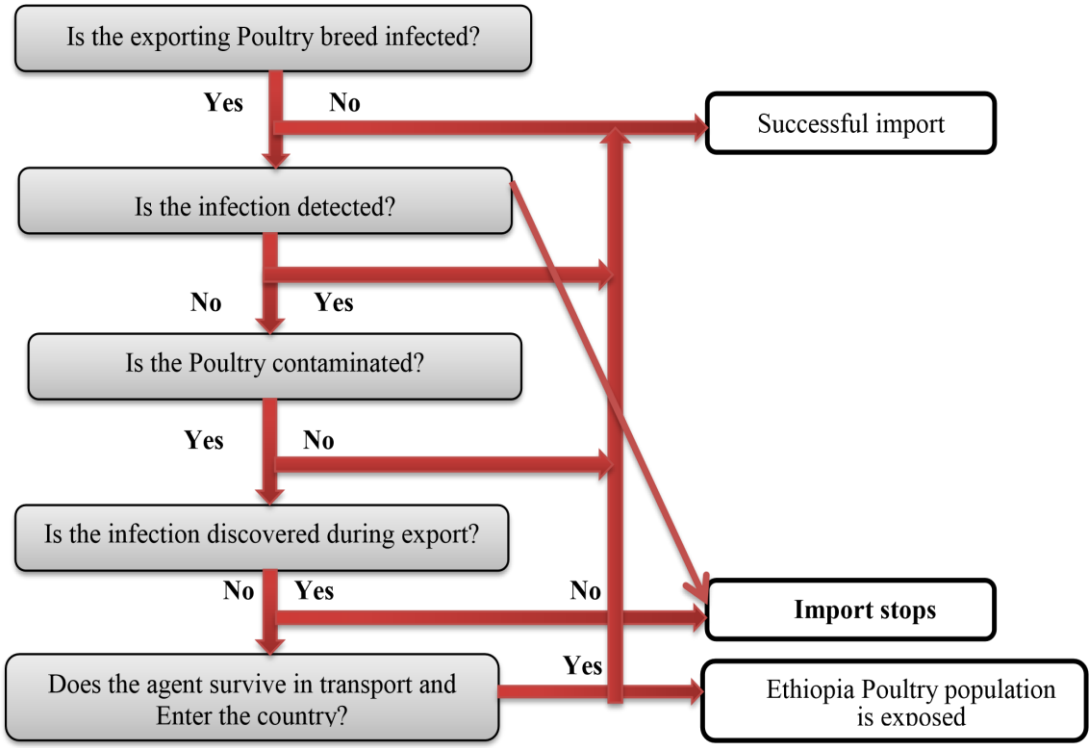
Sources: www.*ethiochicken*.comand *www.isapoultry.com /Hendrix Genetics/*

Figure.2 Scenario tree showing the pre-assessment of the risk



Sources: Desta and Hiwot, (2020); OIE, (2019); OIE, (2013); Alexander, (2003)

Figure.3 Scenario tree used for the entry assessment



Consequence Assessment

The consequence assessment describes the potential consequences of a given exposure and estimates the probability of them occurring. Also describing the relationship between specified exposures to a biological agent and exposures produce adverse health or environmental consequences, which may in turn lead to socio-economic consequences (OIE, 2022; OIE, 2019).

IBV infection can cause Morbidity up to 100%, whereas mortality can rise from 5% to 90% (Ignjatovic *et al.,* 2002; Brandão *et al.,* 2009), IB can cause reproductive disease (loss in egg production, poor hatchability rate of fertile eggs, and soft egg–shell with watery content in layers) weight loss in both broilers and layers (Awad *et al.,* 2014; Almeida *et al.,* 2012). Also the disease cause inefficient feed conversion and mortality cause high economic loss (Kataria *et al.,* 2005; Senthilkumar *et al.,* 2003). The consequences of all strains of highly virulent IBDV (vvIBDV) disease, presented, established and spreading among the poultry's produce adverse poultry health and huge socioeconomic consequences in poultry industry. The consequences considered being non-negligible and the probability is estimated to be very high.

Risk category combination matrix tables

For combination of the combined release and exposure risk estimate with the consequence risk can be estimated by using *combined matrix.*

Risk Estimation

Risk estimation consists of integrating the results from the entry assessment, exposure assessment, and consequence assessment to produce overall measures of risks associated with the hazards identified at the outset. Thus risk estimation takes into account the whole of the risk pathway (OIE, 2022).

In Dutch Netherland and Europe Avian Infectious Bronchitis IBDV (vvIBDV) virus occurs in in large poultry segment; nevertheless the present incidence is unidentified. The chance of emancipating the virus with Commodity is actual high, formerly hosted the establishment and spreading of Avian Infectious Bronchitis infections possibly widespread.

Risk Estimation Conclusion, the Risk Estimation indicate that require strong risk management program because the consequences would be very high in all aspect health,

productivity an socio-economy feature for importing country of Ethiopia. So, need strong risk management platform.

Risk Management

Risk management is the process of deciding upon and implementing measures to address the risks identified in the risk assessment, whilst at the same time ensuring that negative effects on trade are minimized and manage risk appropriately (OIE, 2015).

The strategies of mitigation and management interferences that possibly will aid to manage *Avian Infectious Bronchitis Virus*IBDV (vvIBDV) according to OIE Terrestrial Animal Health Code under Article 10.2.2. and Article 10.2.3. (OIE, 2022), the following:-

- ✓Birds showed no clinical sign of avian infectious bronchitis up to 50 days, In view of that OIE Terrestrial Animal Health Code (OIE, 2022) on the day of shipment and based on the chickens tested for infection results of serological tests transported with international veterinary certificate.
- ✓Accordingly (OIE, 2022), birds could be randomly tested using virus detection or isolation tests, and serological methods, the frequency of testing should be based on the risk of infection and at a maximum interval of 50 days.
- ✓Vaccine against avian infectious bronchitis (the nature of the vaccine used and the date of vaccination should also be stated in the certificate and treating chickens with insect repellents prior to and during transportation;
- ✓During shipment, using historical information or information from appropriately verified and validated epidemiological models to identify low risk ports and transport routes and the chicken are transported to Ethiopia in uncontaminated, idle Package, appropriately sanitized containers and risk free safe shipment also full filed requirement standards documented in the OIE Terrestrial Animal Health Code (OIE, 2022).
- ✓The introduced parent stock should be kept under secure quarantine areas in Ethiopia and a sample of stock tested for *Avian Infectious Bronchitis Virus* prior to distribution.

Conclusion and Recommendations

Avian infectious bronchitis (IB) is a highly contagious disease of poultry with high economic importance. Affording to the result acquired from the risk assessment conducted the possibility of introduction of Avian Infectious Bronchitis Virus in to Ethiopia from Dutch Netherland, the Consequence and Risk estimation was evaluated as **"**very high" and health and economic consequences regarded as actual high due to lower egg production, poor hatchability of eggs, and decreased quality of the egg, weight loss, growth retardation. Lastly, the inclusive risk assessment is high. It persisted determined that introduction of Bovans Brown Poultry Breed be forbidden without proficient and acceptable measures occupied to alleviate the risk.

Based on Qualitative Risk Assessments finding to achieve the risks of importing commodity, the following recommendations are progressed;

- ✓Chicken are transported and Imports to Ethiopia from Dutch Netherland should be accompanied by credentials from applicable authorities, load must be in uncontaminated, idle Package, appropriately sanitized containers and risk free safe shipment.
- ✓Imported animals quarantine using the most appropriate assay as documented full filed requirement standards documented in the OIE Terrestrial Animal Health Code (OIE, 2022).
- ✓Awareness Creation among farer and stakeholder also regular update of information about the disease, strict government policy, proper management practice, and regular vaccination are essential measures to control and avoid disease to create and improve Poultry health hazards and socio-economic impact.
- ✓Strengthen the capacity of the Urban Agricultural Departments to enable them to better monitor and/or supervise the health of the birds making up the local poultry industry.
- ✓Biosecurity measures within the perspective of poultry management systems must be strengthened and integrated into poultry production. Biosecurity constitutes an essential element of the AIBV rejoinder.
- ✓In training small-scale farmers, a serious linkage between poultry development and the poultry health plan should be

References

Abd, E.R.S., El-Kenawy, A.A., Neumann, U., Herrler, G., and Winter, C., (2009). Comparative analysis of the sialic acid binding activity and the tropism for the respiratory epithelium of four different

strains of avian infectious bronchitis virus. *Avian Pathol.*38 (1), 4145.

Alexander, D.J., (2003). Newcastle disease, other Paramyxoviridae and Pneumovirus Infections. In; Diseases of Poultry.11th edn. *Iowa State press, Ames*. pp: 63-100.

Almeida, D. O., Tortelly, R., Nascimento, E. R., Chagas, M. A., Khan, M. I., and Pereira, V. L. A. (2012). Avian infectious bronchitis and deep pectoral myopathy-A case control study. *Poultry science*, 91(12), 3052-3056.

Awad, F., Chhabra, R., Baylis, M. and Ganapathy, K. (2014). An overview of infectious bronchitis virus in chickens. *World's Poultry Science Journal*, 70(2), 375-384.

Beach, J., and Schalm, O. (1936). A Filterable Virus, Distinct from that of Laryngotracheitis, the Cause of a Respiratory Disease of Chicks. *Poultry Science,*15(3), 199-206.

Bekele, A. Z. E. Gelaye, S. Teshale, G. Gelagay, S. Sirak, and Z. Zekarias, (2005). "Investigation on infectious bursal disease outbreak in DebreZeit, Ethiopia," *International Journal of Poultry Science,*4(7), 504-506.

Brandão, P. E., Sandri, T. L., Souza, S. P., Kuana, S. L., Richtzenhain, L. J., and Villarreal, L. Y. B., (2009). Recombination, point mutations and positive selection on the basis of the molecular diversity of Brazilian strains of avian infectious bronchitis virus. In VI International Symposium on Avian Corona-and Pneumoviruses and Complicating

Pathogens, Rauischholzhausen, Germany, 14-17, (pp. 47-58).

Cavanagh, D. (2005). "Coronaviruses in poultry and other birds," *Avian Pathology*, 34(6), 439-448.

Cavanagh, D. (2007). Coronavirus avian infectious bronchitis virus. *Veterinary Research*, 38(2), 281-297.

CPI (Centurion Poultry, Inc.) (2012). Bovansbrownmanagement guide, North American Edition, CPI, Lexington, GA, USA. *Available online at www.centurionpoultry.com.*

Dawit A, Tamirat D, Setotaw F and Serge Nz DR. (2009). Overview and Background Paper on Ethiopia's Poultry Sector: Relevance for HPAI Research in Ethiopia. A Collaborative Research Project. Africa. *Africa/Indonesia Team Working Paper*, 1, 60.

De Wit, J. (2000). Detection of infectious bronchitis virus. *Avian Pathology*, 29(2), 71-93.

DestaAloto and HiwotBelete (2020): Review on Qualitative Risk Assessment on the Introduction of Highly Pathogenic Avian Influenza (H5N1) Virus in to Ethiopia via Importation of Sasso Breed (Poultry) from France. *Int. J. Adv. Res. Biol. Sci*. 7(6), 8-19.

Dhama K., S. D. Singh, and R. Barathidas (2014) "Emergence of avian infectious bronchitis virus and its variants need better diagnosis, prevention and control strategies: a global perspective*," Pakistan Journal of Biological Sciences*, 17(6) 751-767.

Dhinakar Raj, G., and Jones, R. C. (1997). Infectious bronchitis virus: Immunopathogenesis of infection in the chicken. *Avian Pathology,*26(4), 677-706.

Ducatez, M. F., Martin, A. M., Owoade, A. A., Olatoye, I. O., Alkali, B. R., Maikano, I., Snoeck, C. J., Sausy, A., Cordioli, P., and Muller, C. P. (2009). Characterization of a new genotype and serotype of infectious bronchitis virus in Western Africa. *Journal of General Virology,*90(11), 2679-2685.

Getiso, A., B. Bekele, B. Zeleke, D. Gebriel, A. Tadesse, E. Abreham, and H. Jemal. (2017). Production performance of Sasso (distributed by ethio-chicken private poultry farms) and Bovans brown chickens breed under village production system in three agroecologies of Southern Nations, Nationalities, and Peoples Regional State (SNNPR). Ethiopia. *Int. J. Livest. Prod.*8, 145-157.

Gottard, F. and R. SoaresMagalhaes, (2006). Risk and Consequence Assessment of HPAI introduction in Ethiopia. FAO

H. Barua, P. K. Bisuead, N. C. Debnath, M. N. Anwar, and B. C. Dey (2006). "Serosurvey and isolation of infectious bronchitis virus in chicken reared in commercial and semi scavenging system," *Bangladesh Journal of Microbiology,*23, 114-117.

Han, Z., Sun, C., Yan, B., Zhang, X., Wang, Y., Li, C., Zhang, Q., Ma, Y., Shao, Y., Liu, Q., and Kong, X. (2011). A 15-year analysis of molecular epidemiology of avian infectious bronchitis coronavirus in China. Infection, Genetics and Evolution, 11(1), 190-200.

Hutton, S. J. Bettridge, R. Christley, T. Habte, and K. Ganapathy, (2017). "Detection of infectious bronchitis virus 793B, avian metapneumovirus, Mycoplasma gallisepticum and Mycoplasma synoviae in poultry in Ethiopia," *Tropical Animal Health and Production*, 49(2), 317-322.

Ignjatovic, J., Ashton, D. F., Reece, R., Scott, P., & Hooper, P. (2002). Pathogenicity of

Australian strains of avian infectious bronchitis virus. *Journal of Comparative Pathology*, 126(2-3), 115-123.

Jungherr E.L., Chomiak T.W. &Luginbuhl R.E. (1956). Immunologic differences in strains of infectious bronchitis. In Proceedings of the 60th Annual Meeting of the United States Livestock Sanitary Association, 203-209.

Kataria, J. M., Mohan, C. M., Dey, S., Dash, B. B., and Dhama, K. (2005). Diagnosis and immunoprophylaxis of economically important poultry diseases: A review. *The Indian Journal of Animal Sciences,*75, 555–567.

Masters, P. S. (2006). The molecular biology of coronaviruses. Advances in virus research, 66, 193-292.

Mazengia, H. (2012). Review on major viral diseases of chickens reported in Ethiopia. *J. Infect. Dis. Immun.*4, 1-9.

Megerssa YC., Hailu AB. and Tadesse F. (2016). Investigation of Newcastle disease virus using reverse transcription polymerase chain reaction in selected districts of Eastern Shewa. *Journal of Veterinary Science and Technology*, 7(6), 1-4.

Meir, R. O. Maharat, Y. Farnushi, and L. Simanov, (2010). "Development of a real-time TaqMan RT-PCR assay for the detection of infectious bronchitis virus in chickens, and comparison of RT-PCR and virus isolation," *Journal of Virological Methods, vol*. 163(2), 190-194.

Meir, R., Rosenblut, E., Perl, S., Kass, N., Ayali, G., Hemsani, E., and Perk, S. (2010). Identification of a novel nephropathogenic infectious bronchitis virus in Israel. *Avian diseases,*48(3), 635-641.

OIE (2013): Terrestrial Animal Health Code. (World Organization for Animal Health) (www.oie.int).

OIE (2015): Aquatic Animal Health Code. Import risk analysis - Section 2, Chapter 2.1.- 1, 6/06/2015

OIE (2019): Terrestrial Animal Health Code. (World Organization for Animal Health) Twentyeighth editions,

OIE (2021): Terrestrial Animal Health Code. (World Organization for Animal Health). Volume 2. Twenty-ninth editions,

OIE (2022): Terrestrial Animal Health Code. (World Organization for Animal Health). VolumeII, Section 10. Chapter 10.2 Article 10.2.2.

OIE. (2020). Avian Infectious Bronchitis. Retrieved 28th July 2020 from *https://www.oie.int/wahis_2/public/wahid.php/Countryinformation/Countrytimelines*

Ramakrishnan, S., and Kappala, D. (2019). Avian infectious bronchitis virus. *Recent Advances in Animal Virology*, 19(2), 301-319.

Senthilkumar, N., Govindarajan, D., Dhama, K., &Kataria, J. M. (2003). Egg drop syndrome-76 (EDS-76) virus-A Rev. *Indian J. Comp. Microbiol. Immunol. Infect. Dis*, 24, 1-15.

Shapiro, B. I., G. Gebru, S. Desta, A. Negassa, K. Nigussie, G. Aboset, and H. Mechal. (2015).

Ethiopia Livestock Master Plan. ILRI Project Report. International Livestock Research Institute (ILRI), Nairobi, Kenya

Sheble, A., Sabry, M. Z., Davelaar, F. G., Burger, A. G., Khafagy, A. K., Moustafa, F, Moustafa, M.M. and Henna, M. (1986). Present status of infectious bronchitis in Egypt. *J Egyp Vet Med Assoc,*4, 393-411.

Shieh, H. K., Shien, J. H., Chou, H. Y., Shimizu, Y., Chen, J. N., and Chang, P. C. (2004). Complete nucleotide sequences of S1 and N genes of infectious bronchitis virus isolated in Japan and Taiwan. *Journal of veterinary medical science*, 66(5), 555-558.

Smith, W., Cook, J., &Parsell, Z. (1985). The Experimental Infection of Chickens with Mixtures of Infectious Bronchitis Virus and Escherichia coli. *Journal of General Virology,*66(4), 777-786.

Tegegne, D. Y. Deneke, T. Sori (2020). "Molecular epidemiology and genotyping of infectious bronchitis virus and avian metapneumovirus in backyard and commercial chickens in Jimma zone, southwestern Ethiopia," *Veterinary Sciences*, 7(4), 187.

Tesfaye, A. T. Kassa, and S. Mesfin (2019). "Four serotypes of infectious bronchitis virus are widespread in unvaccinated backyard chicken and commercial farms in Ethiopia," *World Journal of Veterinary Science*, 1(1), 1001.

Tulu D., (2019). Epidemiology, Status and Economic Importance of Infectious Bursal Disease in Poultry Production, *Ethiopia. Epidemiol. Int. J.,*3, 128-129.

Wang, Y., Wang, Y., Zhang, Z., Fan, G., Jiang, Y., Liu, X., Ding, J. & Wang, S. (1998). Isolation and identification of glandular stomach type IBV (QX IBV) in chickens. *Chinese Journal of Animal Quarantine*, 15(1), 1-3.

Worthington, K. J., Currie, R. J. W., and Jones, R. C. (2008). A reverse transcriptasepolymerase chain

reaction survey of infectious bronchitis virus genotypes in Western Europe from 2002 to 2006. *Avian Pathology*, 37(3), 247-257.

Wu, Z. Q., Yang, Q. W., Fu, C., Zhao, X. Y., and Ignjatovic, J. (1998). Antigenic and immunogenic characterization of infectious bronchitis virus strains isolated in China between 1986 and 1995. *Avian Pathology,*27(6), 578-585.

Zanella, A., Lavazza, A., Marchi, R., Martin, A. M., and Paganelli, F. (2003). Avian infectious bronchitis: characterization of new isolates from Italy. *Avian Diseases,*47(1), 180- 185.

Zeleke, A.; Gelaye, E.; Sori, T.; Ayelet, G.; Sirak, A. and Zekarias, B. (2005). Investigation on Infectious Bursal Disease Outbreak in DebreZeit, Ethiopia. *Int. J. Poult. Sci.,*4, 504-506.

Zhang, X.; Liao, K.; Chen, S.; Yan, K.; Du, X.; Zhang, C.; Guo, M.; Wu, Y. (2020). Evaluation of the reproductive system development and egg-laying performance of hens infected with TW I-type infectious bronchitis virus. *Vet. Res*. 51, 95.

Website: (https://www.ethiochicken.com/hendrix genetics laying hens) at: 5:14, April, 08, 2023 *www.ethiochicken.com/hendrixgenetics laying hen/and www.isapoultry.com /Hendrix Genetics/* Sources: www.*ethiochicken*.comand *www.isapoultry.com /Hendrix Genetics/*

https://www.id-vet.com/wp.../Poultry-product-list-ELISA-PCR-2019-v1doc9254.pdf,*https://www.intechopen.com/chapters/52046,(https://ethiochicken.com/who-are-we/*https://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.03.02_AIB.pdf

How to cite this article:

Begidu Tesfaye Mune, Tariku Geinoro Alleyo, Eliyas Gezahegn Deksisa and Midekso Sankuro Gaguro. 2024. Qualitative Risk Assessment for the Introduction of Avian Infectious Bronchitis Virus from Dutch Netherlands to Ethiopia via Importation of Bovans Poultry Breed. *Int.J.Curr.Res.Aca.Rev.* 12(9), 79-90.
doi: https://doi.org/10.20546/ijcrar.2024.1209.010