禽場禽流感傳播媒介計畫

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摘要

臺灣自 2015 年 1 月爆發 2.3.4.4 分支 H5 亞型高病原性家禽流行性感冒後，該病毒群持續於家禽場造成疫情，並且不斷演化以及與野外病毒株發生基因體重組。在臺灣的禽流感病毒株越來越複雜的情況下，使得防疫工作、疾病監測以及實驗室診斷作業變得更加困難。審視臺灣家禽產業，造成病毒持續傳播的原因可能是家禽產銷鏈，病死禽運輸系統的生物安全管理不佳等因素。為了瞭解我國禽流感傳播媒介，本計畫自 2018 年起蒐集以下之環境檢體並進行禽流感病毒核酸或病毒監測：(1)家禽流行性感冒陽性案例場、其周邊 3 公里家禽場或前二類型以外的禽場;(2)化製原料運輸車(化製車)消毒前(卸載前)、後樣本。禽場環境在清潔消毒作業後常可在禽舍及飼養設備等處檢測到病毒核酸，顯示現場的清潔消毒觀念以及操作應該加強。禽舍以外的場區環境容易在案例場被檢出病毒，其他類別禽場在此區則很少被檢出，顯示病原可能在撲殺作業中汙染了本區域，應盡快進行清潔消毒。目前結果顯示禽場環境樣本檢測病毒核酸的方式敏感度高，可取代案例場哨兵雞試驗。清潔消毒對於移除化製車的病原效果大多

良好，但偶爾消毒後仍可在腳踏墊與廢液收集槽檢測到病毒。此外，從化製車所分離到的病毒可協助實驗室瞭解現場流行病毒株的基因體資訊，協助檢視檢驗工具是否需要調整。禽場環境監測的成果透過教育訓練之方式培訓家禽產業相關的種子教師，進而幫助所輔導的禽場降低禽流感發生的風險。相關成果亦可提供動物疾病防治主管機關，作為防疫策略擬定之參考。

Vectors of avian influenza in poultry farms

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Abstract

Since the outbreaks of highly pathogenic avian influenza caused by H5 viruses of the clade 2.3.4.4 in January 2015, these viruses have continued to cause outbreaks in poultry farms and to evolve and reassortant with those avian influenza viruses carried by wild birds. As the avian influenza viruses in Taiwan evolve to become more divergent, disease monitoring and laboratory diagnosis become increasingly difficult. Poor biosafety management of poultry production systems, supply chains, as well as waste management systems may be the forces that sustain the continuing spread of these viruses in Taiwan's poultry industry. In order to understand the risk factors responsible for avian influenza transmission, a monitoring project based on environmental sampling was established in 2018. Monitoring for the presence of avian influenza virus nucleic acid were conducted on: (1) avian influenza infected farms and farms within 3 kilometers of the infected farms, and farms neither infected nor around the infected ones; and (2) animal waste trucks, before waste disposal, after waste disposal and after disinfection. After cleaning and disinfecting poultry farms, viral nucleic acids can often still be detected in poultry houses and breeding facilities, which indicate that standards of biosafety management should be strengthened. The virus and its nucleic acid were easily detected in the areas around the poultry houses on the infected farms but, in comparison, not in the non-infected farms, which indicates that the virus may contaminate the environment during the stamping-out operation. Cleaning and disinfection of the infected farms should thus be conducted as soon as culling operations end. The results demonstrate that the detection methods used to monitor for the persistence of avian influenza viruses in the environment are very sensitive and can replace monitoring with sentinel chickens. Cleaning and disinfection of animal waste trucks can effectively reduce the amount of pathogens, but viruses can occasionally be detected on vehicle tires and in liquid waste collection tanks after disinfection. Virus isolation efforts targeting animal waste trucks have allowed us to obtain more virus strains from the field and viral genomic analyses can determine if the current diagnostic tools are still adequate. The environmental monitoring of poultry farms for avian influenza viruses has the added effect of training technical and management personnel in the proper biosafety protocols needed for the biologically healthy and cleanly operation of poultry farms. The results of this project can also guide animal disease control authorities in further optimizing control strategies for avian diseases.