

**Table S1.** Defining the problem: Translocation of European Association of Zoos and Aquaria (EAZA) Ex situ Programme (EEP) captive pink pigeons *Nesoenas mayeri* to Mauritius. <sup>a</sup>Shopland et al. (2020a) <sup>b</sup>Shopland et al. (2020b)

Consideration	Description
Question	What is the risk of disease transmission from the EEP captive pink pigeon population to the Mauritian pink pigeon population?
Goal	Develop a practical, pre-export quarantine protocol to minimise the risk of disease spread to pink pigeons in Mauritius, as well as taking into consideration risks to endemic wild birds and poultry
Scope	Literature review of reported diseases in Columbiformes and emerging avian diseases Retrospective mortality review of the European captive population (1977–2018) <sup>a</sup> Health screening of the EEP captive population (2017–2018) <sup>b</sup> Input of relevant experts and stakeholders including the Mauritian Government, Mauritian Wildlife Foundation (MWF), MWF veterinary advisor, EEP veterinary advisor and coordinator and staff working with the captive birds
Focus	Genetic rescue: translocate captive EEP birds to Mauritius to increase genetic diversity and fitness, reduce genetic load and create a more sustainable free-living population
Assumptions	Post-release monitoring of translocated pink pigeons and their offspring will occur MWF will continue to health screen free-living and captive pink pigeons Dead pink pigeons will receive full post-mortem examinations Ecological, socio-economic, financial and invasion risks will be low as pink pigeons are already present in the area and translocated birds will be entering captive breeding facilities
Limitations	Risk mitigation strategies must ensure the welfare of exported birds is not compromised—this will influence management and disease screening during the pre-export quarantine period Diseases can be shed intermittently The source population may be asymptotically carrying pathogens acquired in captivity Laboratory tests have variable sensitivity and specificity Multiple unpredictable and external factors can affect disease carriage and transmission
Acceptable level of risk	Considering that without genetic rescue the pink pigeon may be extinct in 100 years, that translocated birds will be entering captive breeding facilities and that welfare of quarantined birds is paramount, if the disease risk is ‘low’ after disease mitigation strategies are performed, translocation can proceed

**Table S2.** Pathogens requiring risk mitigation strategies prior to translocation of EEP pink pigeons *Nesoenas mayeri* to Mauritius. <sup>a</sup>Bunbury et al. (2007a, 2008a); Swinnerton et al. (2005a) <sup>b</sup>Lawson et al. (2011) <sup>c</sup>Shopland et al. (2020b) <sup>d</sup>Ball et al. (2012) <sup>e</sup>Beckmann et al. (2014); Pennycott (2016) <sup>f</sup>Shopland et al. (2020a) <sup>g</sup>Balsamo et al. (2017) <sup>h</sup>Pennycott (2016); Pennycott et al. (2006) <sup>i</sup>Brunthaler et al. (2021); Mather et al. (2016) <sup>j</sup>Daoust and Prescott (2008); EFSA AHAW Panel et al. (2017); Harlin and Wade (2009) <sup>k</sup>Abolnik (2014) <sup>l</sup>APHA (2014, 2018a, c) <sup>m</sup>Crespo et al. (2018); Herdt and Pasmans (2009); Pennycott (2008) <sup>n</sup>Niczyporuk et al. (2020) <sup>o</sup>Duchatel and Szeleszczuk (2011); Herdt and Pasmans (2009); Stenzel et al. (2012) <sup>p</sup>Sarker et al. (2019) <sup>q</sup>Snyder et al. (1985) <sup>r</sup>Phalen et al. (2017); Woźniakowski et al. (2013) <sup>s</sup>Swinnerton (2001); Cristinacce et al. (2009) <sup>t</sup>Blakey et al. (2019); Hunnam et al. (2019); McCowan et al. (2018); Rubbenstroth et al. (2018) <sup>u</sup>Sawicka et al. (2020) <sup>v</sup>Bunbury et al. (2007b); Peirce et al. (1997) <sup>w</sup>Peirce et al. (1977) <sup>x</sup>Hussein and Abdelrahim (2016); Joshi et al. (2017); Nebel et al. (2020) <sup>y</sup>Bueno et al. (2010); Derraik et al. (2008); LaPointe et al. (2012); Ortiz-Catedral et al. (2019) <sup>z</sup>Bunbury et al. (2007b) <sup>aa</sup>Da Silva et al. (2021) <sup>ab</sup>Atkinson and LaPointe (2009); Atkinson and Samuel (2010) <sup>ac</sup>Zwart and Hooimeijer (1985); Scullion and Scullion (2007) <sup>ad</sup>Pennycott (2016) <sup>ae</sup>Monks et al. (2006) <sup>af</sup>Shopland et al. (2020a) <sup>ag</sup>Harlin and Wade (2009); Sol et al. (2000) <sup>ah</sup>Flochlay et al. (2017).

Pathogen	Group of concern	Found in Mauritius?	Risk	Magnitude of consequence of disease	Mitigation strategies	Consequence if positive post mitigation strategies
<i>Trichomonas gallinae</i>	Pink pigeon, endemic wild birds	Yes <sup>a</sup>	High (pink pigeon, endemic wild birds)	Pink pigeon mortality in Mauritius and a threat to the species' recovery <sup>a</sup> Epidemic mortality in passerines <sup>b</sup> Found in EEP health screen <sup>c</sup>	Crop swab for culture using method previously described for pink pigeons <sup>c</sup> Prophylactic treatment with carnidazole Optimal hygiene around drinking water and feeders	Repeat test post-treatment with carnidazole, if still positive either repeat treatment/testing (if time), or remove from translocation
<i>Eimeria</i> spp.	Pink pigeon	Yes <i>Eimeria mauritiensis</i> detected in pink pigeons <sup>d</sup>	High (pink pigeon)	Young birds most susceptible, main risk to squabs in captive breeding facilities Found in EEP health screen <sup>e</sup>	Five-day pooled faecal sample for faecal flotation Prophylactic treatment with toltrazuril	Repeat test post-treatment with toltrazuril, if still positive either repeat treatment/testing (if time), or remove from translocation
<i>Chlamydia psittaci</i>	Pink pigeon, endemic wild birds, poultry	Unknown but very likely	High (all)	Mortality reported in Columbiformes in UK <sup>e</sup> Found in pink pigeon mortality review <sup>f</sup> Human health concern <sup>g</sup>	Five-day pooled faecal sample for PCR Haematology (leucocytosis with monocytosis) and radiography (hepatosplenomegaly) Prophylactic treatment with doxycycline	Following 30 days treatment with doxycycline, repeat test, remove from translocation if still positive
<i>Salmonella</i> spp.	Pink pigeon, endemic wild birds, poultry	Unknown but suspected	High (all)	<i>S. typhimurium</i> mortality in UK Columbiformes <sup>h</sup> Mass mortality in passerines <sup>i</sup> <i>S. pullorum</i> and <i>S. gallinarum</i> serious economic impact for poultry, isolated from pigeons <sup>j</sup>	Five-day pooled faecal sample for <i>Salmonella</i> spp. culture	Depending on species found either remove from translocation or treat with antibiotics based on sensitivity results, then retest—if still positive remove from translocation
Avian influenza (highly pathogenic avian influenza: HPAI)	Endemic wild birds, poultry	Not seen	High (poultry, endemic wild birds)	Pigeons not generally clinically affected, ineffective propagators of HPAI <sup>k</sup> but virus constantly evolving and can be devastating to other species	Oropharyngeal swab and cloacal swab for AI PCR	Remove from translocation
Paramyxoviruses: APMV-1/PPMV-1	Pink pigeon, endemic wild birds, poultry	Not seen	High (poultry) Medium (pink pigeon, endemic wild birds)	Major concern for poultry industry Outbreaks and mortality with PPMV-1 in the UK <sup>l</sup>	Blood sample for PPMV-1 HAIT Oropharyngeal swab and cloacal swab for APMV-1 PCR	Remove from translocation
Adenoviruses	Pink pigeon, endemic wild birds, poultry	Unknown	High (poultry) Medium (pink pigeon, endemic wild birds)	Disease may contribute to mortality in squabs <sup>m</sup> Fowl adenovirus can be carried by pigeons <sup>n</sup>	Five-day pooled faecal sample for pan-adenovirus PCR	Remove from translocation
Pigeon circovirus (PiCV)	Pink pigeon, endemic wild birds	Unknown	Medium (pink pigeon, endemic wild birds)	Believed to be a major cause of mortality in squabs <sup>o</sup> Spillover events with circoviruses reported <sup>p</sup>	Cloacal swab for PiCV PCR	Remove from translocation
Pigeon herpesvirus (PiHV)	Pink pigeon, endemic wild birds	Unknown	Medium (pink pigeon, endemic wild birds)	Death reported in neonatal pink pigeons in United States <sup>q</sup> Spillover events with PiHV reported <sup>r</sup>	Pharyngeal swab for PiHV PCR	Remove from translocation

**Table S2.** (Continued) pathogens requiring risk mitigation strategies prior to translocation of EEP pink pigeons *Nesoenas mayeri* to Mauritius

Pathogen	Group of concern	Found in Mauritius?	Risk	Magnitude of consequence of disease	Mitigation strategies	Consequence if positive post mitigation strategies
Pigeon pox virus	Pink pigeon, endemic wild birds	Yes <sup>s</sup>	Medium (pink pigeon, endemic wild birds)	Can impair vision and affect eating leading to starvation and death	Visual inspection for characteristic lesions of pox virus and control of ectoparasite vectors (fipronil, ivermectin)	Perform histopathology of lesions or PCR. If positive result, remove from translocation
Rotavirus	Pink pigeon	Not seen	Medium (pink pigeon)	Responsible for high morbidity and mortality in Columbiformes <sup>t</sup>	Monitoring for clinical signs (high morbidity and mortality, vomiting, diarrhoea) Disease surveillance close to source population	If suspected, remove from translocation
<i>Mycobacterium avium</i>	Pink pigeon	Unknown but likely	Medium (pink pigeon - individual)	Several recorded deaths in European population <sup>f</sup> Disease build-up greater in a confined environment	Blood sample for haematology (leucocytosis, monocytosis) Radiography (granulomas, bone lesions) Body condition (often thin)	Remove from translocation if suspected
<i>Yersinia pseudotuberculosis</i>	Pink pigeon	Unknown—suspect less concern due to warm climate	Medium (pink pigeon - individual)	Several recorded deaths in European population <sup>f</sup> Disease build-up greater in a confined environment and from pest species	Wild bird- and rodent-proof quarantine facility Consider exporting birds in warmer months	Remove from translocation if suspected
<i>Mycoplasma</i> spp.	Poultry, endemic wild birds	Unknown	High (poultry) Medium (endemic wild birds)	<i>M. gallisepticum</i> and <i>M. synoviae</i> —major respiratory disease in poultry and conjunctivitis in North American passerines <sup>u</sup>	Pharyngeal swab for PCR	If <i>Mycoplasma</i> spp. detected is considered high risk, remove from translocation
<i>Leucocytozoon</i> spp.	Pink pigeon, endemic wild birds	Yes <sup>v</sup>	Medium (pink pigeon, endemic wild birds)	Reduction in pink pigeon survival has been recorded <sup>v</sup>	Direct microscopy of a blood smear and control of ectoparasite vectors (fipronil, ivermectin)	Remove from translocation
<i>Haemoproteus</i> spp.	Pink pigeon, endemic wild birds	Yes <sup>w</sup>	Medium (pink pigeon, endemic wild birds)	Can be subclinical, but morbidity and mortality reported in Columbiformes <sup>x</sup> Mortality in many wild bird species <sup>y</sup>	Direct microscopy of a blood smear and control of ectoparasite vectors (fipronil, ivermectin)	Remove from translocation
<i>Plasmodium</i> spp.	Pink pigeon, endemic wild birds	Yes <sup>w</sup>	High (endemic wild birds), Medium (pink pigeon)	Vectors present in Mauritius <sup>z</sup> Mortality in young racing pigeons <sup>aa</sup> Devastating effect on other small island populations of passerines <sup>ab</sup>	Direct microscopy of a blood smear and control of ectoparasite vectors (fipronil, ivermectin)	Remove from translocation
<i>Hexamita columbae</i>	Pink pigeon	Unknown	Medium (pink pigeon)	Mortality reported in young birds <sup>ac</sup> More of concern for captive breeding facilities	Direct microscopy of a fresh faecal sample or cloacal swab and prophylactic treatment with carnidazole	Repeat test post-treatment with carnidazole, if still positive either repeat treatment/testing (if time), or remove from translocation
<i>Ornithostrongylus</i> spp., <i>Ascaridia columbae</i> , <i>Capillaria</i> spp.	Pink pigeon	Unknown	Medium (pink pigeon - individual)	Can cause disease in severe infestations <sup>ad</sup> More of concern for captive breeding facilities	Faecal flotation (five-day pooled sample) and prophylactic treatment with ivermectin	Repeat test after treatment with ivermectin, if still positive either repeat treatment/testing (if time), or remove from translocation

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Pathogen	Group of concern	Found in Mauritius?	Risk	Magnitude of consequence of disease	Mitigation strategies	Consequence if positive post mitigation strategies
<i>Ixodes</i> spp.	Pink pigeon	Unknown	Medium (pink pigeon - individual)	<i>Ixodes frontalis</i> causes tick reaction syndrome <sup>ae</sup> Has caused death in European population <sup>af</sup>	Visual examination for ticks, manual removal if present and prophylactic treatment with fipronil	Repeat exam after treatment with fipronil, if still present either repeat treatment/ testing (if time), or remove from translocation
<i>Pseudolynchia canariensis</i> (pigeon louse fly)	Pink pigeon, endemic wild birds	Unknown	Medium (pink pigeon, endemic wild birds)	Potential vector for disease e.g. <i>Haemoproteus</i> spp. <sup>ag</sup>	Visual examination for flies and prophylactic treatment with fipronil	Repeat exam after treatment with fipronil, if still present either repeat treatment/ testing (if time), or remove from translocation
<i>Dermanyssus gallinae</i> , <i>Ornithonyssus sylviarum</i> , <i>Knemidokoptes mutans</i> , <i>K. laevis</i>	Poultry	Unknown	High (poultry)	Potential to negatively affect the poultry industry <i>D. gallinae</i> one of most damaging parasites of laying hens worldwide and may act as vector for several diseases <sup>ah</sup>	Visual examination and prophylactic treatment with ivermectin and fipronil	Repeat exam after treatment with ivermectin and fipronil, if still positive either repeat treatment (if time), or remove from translocation
Other ectoparasites	Endemic wild birds and poultry	Unknown	Unknown	Absence of sufficient data on potential severity and ability to act as vectors	Visual examination and prophylactic treatment with ivermectin and fipronil	Repeat exam and depending on species found either repeat treatment (if time) or remove from translocation
Other endoparasites	Endemic wild birds and poultry	Unknown	Unknown	Absence of sufficient data on potential severity— would likely only affect individual birds	Faecal examination and prophylactic treatment with ivermectin +/- appropriate anti-parasitic medication	Repeat faecal exam and depending on species found either repeat treatment (if time), or remove from translocation