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RESEARCH NOTES/CASE REPORTS

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Isolation of Avian Paramyxoviruses (Yucaipa-like) from Wild Birds in Kenya, 1980–1982

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The most prevalent and serious disease-causing avian paramyxovirus is Newcastle disease virus (NDV), but in recent years, mainly as a result of influenza surveillance programs, numerous paramyxoviruses, distinct from NDV, have been isolated from avian species (Alexander, 1980, Vet. Bull. 50: 737–752). Between February 1980 and August 1982, cloacal swabs from 443 wild birds of 57 species, representing 28 families, were collected at eight different sites in Kenya for attempted virus isolation. Small birds were captured by mist nets, while large game birds were shot. Cloacal swabs were taken from each bird and placed in transport medium consisting of phosphate buffered saline and 40% glycerol with Penicillin, Streptomycin, Polymixin B and Gentamycin. The samples were kept on ice in the field and then stored at −70 C in the laboratory.

The collection sites were widely separated geographically. Kariobangi is a sewage treatment plant in Nairobi. Birds netted here belonged to Motacillidae, Sylviidae, Hirundinidae, Ploceidae and Estrildidae families. Lakes Nakuru, Bogoria and Ol Bollosat are salt/alkaline lakes in the East African Rift Valley. Birds collected around the lakes were mainly of Anatidae and Ardeidae families. Kajiado District is a dry savanna with seasonal water courses; members of the Numididae, Pteroclidae, Columbidae and Phasianidae families were shot here. Lower Kabete is a marshland which served as a roost mainly for Motacillidae and Ploceidae families. Ngulia Lodge, Tsavo National Park West, is in a dry savanna region and here birds of Turdidae, Laniidae and Muscicapidae families were netted. Kapsarok area, Kericho District, is a forest region at an altitude of 1,524 m and birds of the families Picidae, Dicruridae and Pycnonotidae were netted here.

After light centrifugation (800 g, 10 min) the samples were inoculated into the allantoic cavity of 9- to 11-day-old embryonated chicken eggs and incubated at 33 C for 72–96 hr. Of the 443 samples tested 7 (1.6%) were positive for hemagglutinating activity (Table 1). All the seven isolates were from apparently healthy migratory yellow wagtails (*Motacilla flava* Dumont) netted at the Kariobangi site. Among the infected birds more isolations of virus were made in adult birds (57.1%) than in young birds (42.9%) while females (57.1%) showed a higher proportion of positive samples than males (42.9%). The isolates were characterised by hemagglutination inhibition (HI) tests using typing antisera of chicken origin at the W.H.O. Collaborative Centre for Collection and Evaluation of Data on Comparative Virology, Munich, West Germany. Their

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TABLE 1. Prevalence of avian paramyxoviruses (Yucaipa-like) in wild birds from Kenya, 1980–1982.

Family and species	Total birds		
	Examined	Infected	(%)
Motacillidae			
Motacilla flava Dumont	134	7	(5.2)
Phasianidae			
Pternistis leucoscepus (Gray)	45	0	(0)
Anatidae			
Anas undulata Dubois	28	0	(0)
Numididae			
Numida mitrata Pallas	23	0	(0)
Turdidae			
Lusinia megarhynchos Brehm	19	0	(0)
Sylviidae			
Sylvia communis Latham	18	0	(0)
Acrocephalus palustris (Bechstein)	17	0	(0)
Locustella fluviatilis (Wolf)	13	0	(0)
Ardeidae			
Phoeniconaias minor (Geoffroy)	13	0	(0)
Estrildidae			
Estrilda astrild (Linnaeus)	11	0	(0)
Hirundinidae			
Hirundo rustica Linnaeus	10	0	(0)
Columbidae			
Streptopelia capicola (Sundevall)	10	0	(0)
Other species[1]	102	0	(0)
Total	443	7	(1.6)

[1] Species from which less than ten birds per species were sampled (number sampled). Motacillidae: *Motacilla aguimp* Dumont (4). Phasianidae: *Francolinus sephaena* (Smith) (2). Anatidae: *Anas acuta* Linnaeus (6); *Spatula clypeata* Linnaeus (3); *Anas erythrorhyncha* Gmelin (1); *Alopochen aegyptiacus* (Linnaeus) (1). Turdidae: *Cassypha natalensis* Smith (4); *Monticola saxatilis* (Linnaeus) (1); *Turdus pelios* Bonaparte (1); *Turdoides jardinei* (Smith) (1). Sylviidae: *Phylloscopus trochilles* (Linnaeus) (8); *Sylvia borin* (Boddaert) (4); *Phyllolais pulchella* (Cretzschmar) (2); *Cisticola galactates* (Temminck) (2). Estrildidae: *Estrilda rhodopyga* Sundevall (4); *Spermester cucullatus* Swainson (3). Hirundinidae: *Riparia riparia* (Linnaeus) (6). Columbidae: *Stigmatopelia senegalensis* (Linnaeus) (2). Collidae: *Colius striatus* (Gmelin) (5). Muscicapidae: *Muscicapa striata* (Pallas) (4); *Melaenornis edolioides* (Swainson) (1); *Tchitrea viridis* (Muller) (1). Pteroclidae: *Eremialector coronatus* (Lichtenstein) (3); *Pterocles exustus* Temminck and Laugier (3). Pycnonotidae: *Pycnonotus barabatus* (Desfontaines) (3); *Stelgidocichla latirostris* (Strickland) (2); *Blenda synadactyla* Swainson (1). Nectariniidae: *Nectarinia cuprae* Shelley (2); *Chalcomitra senegalensis* (Linnaeus) (3). Laniidae: *Laniarius erythrogaster* (Cretzschmar) (3); *Tchagra australis* (Reichenow) (1). Capitonidae: *Euplectes diadermatus* Fischer and Reichenow (2). Podicipedidae: *Colluspasser albonotatus* (Cassin) (1). Ploceidae: *Othyphantes reichenowi* (Fischer) (1); *Vidua macroura* (Pallas) (1); *Ploceus ocularis* Neumann (1). Phaethontidae: *Phalacrocorax carbo* (Linnaeus) (1). Tytonidae: *Tyto alba* (Scopoli) (1). Fringillidae: *Serinus striolatus* (Ruppell) (1). Sturnidae: *Cinnyricinclus leucogaster* (Boddaert) (1). Alcedinidae: *Ispidina pictus* (Boddaert) (1). Picidae: *Dendropicos fuscescens* (Vieillot) (1). Trogonidae: *Apaloderma narina* (Stephens) (1). Accipitridae: *Accipter minullus* (Daudin) (1). Dicruvidae: *Dicrurus adsimilis* (Bechstein) (1).

hemagglutinating activity was inhibited to varying degrees in HI tests using antiserum to chicken/California/Yucaipa/56 virus (Table 2).

Yucaipa-like viruses are apparently endemic in birds of the order Passeriformes (Fleury and Alexander, 1979, Avian Dis. 23: 742–744). The present report is further evidence of the presence of these viruses in apparently healthy passerine birds. There was apparently no seasonal influence on infection since viruses were isolated from migrating birds both at the time of departure (March) from and arrival (October) to Kenya. Virus isolation correlated with a particular bird species implying that the viruses may be endemic in the yellow wagtail population and an epornotic of infection was not in progress at the time of this study.

Similar viruses have been isolated from domestic poultry in USA, Canada, USSR, Israel, Italy and Japan, and from imported exotic birds in Northern Ireland, England and Japan (Alexander, 1980, Vet. Bull. 50: 737–752). There was no evidence to indicate that migratory birds were transmitting the infection to resident birds or vice versa in this study; however the possibility of transmission of viruses from

TABLE 2. Hemagglutination-inhibition reactions of the viral isolates from yellow wagtails using chicken antisera against prototype strains of avian paramyxoviruses.

Isolate designation	PMV-2 ck/Yuc/56	PMV-3 ty/Wis/68	PMV-4 dk/HK/ D3/75	PMV-6 dk/HK/ 199/77	PMV-7 dove/Tn/75
Yellow wagtail/Kenya/1/80	1:80	1:20	1:10	1:20	1:10
Yellow wagtail/Kenya/2/80	1:160	1:20	1:10	1:10	1:10
Yellow wagtail/Kenya/3/80	1:80	1:10	1:10	1:10	1:10
Yellow wagtail/Kenya/4/80	1:80	1:10	1:10	1:10	1:10
Yellow wagtail/Kenya/5/80	1:320	1:20	1:10	1:10	ND*
Yellow wagtail/Kenya/6/80	1:160	1:10	1:10	1:10	1:10
Yellow wagtail/Kenya/7/80	1:640	1:20	1:10	1:40	1:10

* ND = not done.

wild to domestic fowl makes it desirable to keep wild birds out of poultry houses. In Kenya, these are usually open enclosures and it is common to see wild birds feeding on the domestic poultry feed. No significance can be attached to the observation that adult birds and females had more positive samples than juveniles and males respectively, since the total number of virus isolations was small.

It is of interest that no avian influenza viruses were isolated from the Anatidae family, although they have been isolated from cloacal swabs of wild waterfowl in other parts of the world (Slemons et al., 1974, Avian Dis. 18: 119–123; Webster et al., 1976, J. Gen. Virol. 32: 217–225). Failure to isolate viruses from most of the other avian species may be explained by the small number of birds sampled.

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Two Cases of Tuberculosis in Raptors in Colorado

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Tuberculosis has been reported occasionally in wild birds of prey in North America (Emerson et al., 1970, J. Am. Vet. Med. Assoc. 157: 606; Sykes, 1982, J. Wild. Dis. 18: 495–499). Avian tuberculosis (ATB) has been reported outside the United States in raptors from zoological collections and in free-ranging species (Lumeij et al., 1981, *In* Recent Advances in the Study of Raptor Disease, Cooper and Greenwood (eds.), Chiron Publ. Ltd., West Yorkshire, England, pp. 137–139).

Most reported cases of avian tuberculosis are of the disseminated visceral form involving the digestive tract, liver, and spleen, and probably are acquired via an oral portal of entry (Gale, 1971, *In* Infec-

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