

A retrospective review of the histopathology of captive hornbill chicks

Supplementary table:

Supplementary Table I: The history, additional tests performed, test results, and findings in each organ system for each hornbill chick

Chick no	History	Additional tests	Test results	CNS	CVS	Resp	GIT	Liver	Panc	Spleen	Urinary	Bone Marrow	Repr	Skin	MSS	Endo	Lympho	Other
H1	Foetus died in shell-nearly full term	none		NSF (brain)	NSF (heart)	NS	NSF (gizzard, intestine)	Lipidic degener-ation, moderate, diffuse	NS	NS	NS	NS	NS	NSF	NSF (muscle)	NS	NS	Necrosis of yolk fat, mild, multifocal
H2	Started pipping internally on 09/02/13, still had not pipped externally by 12/02/13. Small hole made in shell, chick still alive, by breeding centre manager. +/- 13h00 movement of chick ceased	Aerobic culture (yolk)	No significant isolates were found	NSF (brain)	NSF (heart, aorta)	Pulmonary atelectasis, mild, multifocal	NSF (yolk sac, oesophagus, proventriculus, gizzard, intestine)	Heterophilic myelopoiesis, mild, multifo-cal; Lipidic degeneration, mild, diffuse	NS	NS	NSF	NS	NS	NSF	NS	NS	Lymphoid necrosis, severe, multifo-cal (Bursa); NSF (thymus)	NS
H3	Internal activity and vocalisation but could not external pip. Defaecated in egg. Still +++ blood vessels at pointed end. Consistency of skin very jelly like worried re congenital deformity.	Aerobic culture (yolk); Avian Influenza (Swab (cloaca & trachea)	Pseudomas and other contami-nants were isolated (no pathogens); small numbers of immature erthto-cyets (likely normal for age) and marked leucopaenia	NSF (brain)	Myocardial haemorrhage, mild, focal, acute	NSF (lung)	NSF (oesophagus, proventriculus, gizzard, intestine)	Lipidic degener-ation, moderate, diffuse; Haematopoie-sis, moderate, multifocal	NS	Lymphoid atrophy and lymphocy-tolysis, marked; haematopoiesis, moderate	NSF	NS	NS	Heterophilic demati-tis, mild, multifocal, acute	NSF (muscle)	NS	Lymphoid atrophy and lymphocy-tolysis, marked (Bursa); Hetero-philic bursitis, mild, multifocal, acute	Yolk sac haematopoiesis, moderate
H4	Chick was harvested, arrived at hospital at 14:21. chick was checked at 13:51 it was asleep and had wee inflated air sacs. At 16:30 chick was giving no feeding response so left to sleep/ At 17:05 the chick was found dead in brooder.	none		NS	NSF (heart)	Heterophilic air sacculitis, severe, focal, acute; NSF (lung)	NSF (oesophagus, proventriculus, gizzard, intestine)	Lipidic degeneration, mild, diffuse	NS	NS	Haematopoie-sis, moderate, multifocal	NS	NS	NSF	NSF (muscle)	NS	NS	Heterophilic cellulitis, moderate, focal, acute
H5	Chick hatched 2/11/03 in incubator after 4 days of activity in egg. Started feeding chick with rat pups on 3/11. Lost interest in food on 4/11 , airsacs were flat- started to vomit later that day, was rx on oral synlet /sd bid? Was having humidity problems in incuba-tor- died that night	none		NS	NSF (heart)	Pulmonary atelectasis and emphysema, moderate, multifocal; NSF (trachea)	NSF (oesophagus, gizzard, intestine)	Lipidic hepatocelular degeneration, moderate, diffuse; heterophilic myelopoiesis, moderate	NS	NS	NSF	NS	NSF (testis)	Necrotizing dermatitis, mild, focal, acute	NS	NSF (Adrenal)	NS	NS
H6	Had head injury at hatch treated by local vet with fluids & ABS, weakened & dead	none		Cerebral haemorrhage and necrosis, moderate, multifocal, acute	NSF (heart)	Pulmonary haemorrhage, moderate, multifocal, acute	NSF (gizzard, intestine)	Haematopoiesis, marked, multifo-cal	NS	Haematopoiesis, marked, multifo-cal	Tubular necrosis, marked, segmental, acute with haemor-rhage, multifocal severe	NS	NS	NSF	NS	NSF (Adrenal)	NS	Peri-ocular meningeal haemorrhage, moderate, multifocal, acute

H7	Arrived very weak & dehydrated, regurgitated	none		NS	NSF (heart)	NSF (lung)	NSF (proventriculus, gizzard, intestine)	NSF	NS	NS	NSF	NS	NS	NSF	NSF (muscle)	NSF (adrenal)	NSF (Thymus)	NS
H8	Infectious?	none		NS	NSF (heart)	Pulmonary oedema, mild, diffuse, acute	Heterophilic serositis, marked, diffuse with intralesional tophi; NSF (gizzard, intestine)	Lipidic degeneration, moderate, diffuse with haematopiesis	NS	Lymphoid atrophy, moderate, diffuse	Haematopoiesis, moderate, multifocal	NS	NS	NS	NS	NS	NS	NS
H9	harvested, 4/12, fed regularly, 6/12 appetite reduced, regurgitated.	Aerobic culture (abdominal fluid); Avian influenza	A heavy mixed growth of bacteria was isolated from both samples	NSF (brain)	NSF (heart)	Lymphoplasma-cytic and histiocytic interstitial pneumonia with type II Pneumocytes hyperplasia, moderate, diffuse	NSF (oesophagus, proventriculus, intestine)	Hydropic degeneration, mild, diffuse and heterophilic myelopoiesis, moderate	NSF	Heterophilic myelopoiesis, moderate, multifocal	Heterophilic myelopoiesis, marked, diffuse	NS	NS	NS	NS	Adrenocortical hyperplasia, marked, diffuse	NS	NS
H10	beaten up by the group, found dead	none		NSF (brain)	NSF (heart)	NS	NSF (gizzard, intestine)	NS	NSF	NS	NSF	NS	NS	NSF	NS	NSF (Adrenal)	Lymphoid necrosis and depletion moderate, diffuse (Bursa)	NS
H11	assisted hatch 12/12, was not passing faeces			NSF (brain)	NSF (heart)	NS	Necrotising ventriculitis, moderate, zonal extensive with intralesional rods; NSF (intestine)	Hydropic and lipidic degeneration, mild, diffuse and heterophilic myelopoiesis, mild, diffuse	NSF	Lymphoid atrophy, mild, multifocal	Heterophilic myelopoiesis, mild, multifocal	NS	NS	NSF	NS	NS	Lymphoidnecrosis, mild, multifocal	NS
H12	Eating well, good feeding response till day 6, crashed following day	none		NS	NSF (heart)	NSF (lung)	Necrotizing heterophilic enteritis, diffuse, severe, acute with intralesional rods; NSF (gizzard)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
H13	Chick was not vocal as it should have been. Faeces were good, seen on the leaves of the nest w clear distinction between white and solids. Chick remained yellowish and skin wrinkled. Air sacs full reminded me of fading puppy syndrome	Aerobic culture (Lung)	Enterococcus species (antibio-gram provided)	NS	NSF (heart)	Fibrinonecrotic and heterophilic broncopneumonia, focal, moderate, acute with cocobacilli	NSF (Gizzard)	Lipidic hepatocellular degeneration, mild, diffuse with hematopoiesis, moderate, multifocal	NS	Lympoid atrophy, mild, multifocal	NS	NSF	NS	NSF	NSF (bone, muscle)	NSF (thyroid, parathyroid)	NS	NS
H14	Developed diarrhoea 3 days ago, appetite slightly decreased	none		NS	NSF (heart)	NSF (lung)	Necrohaemorrhagic ventriculitis, multifocal, moderate to severe, acute with intralesional bacterias; NSF (oesophagus, proventriculus, intestine)	Lipidic degeneration, moderate, diffuse; heterophilic myelopoiesis, moderate	NS	Lymphoid hyperplasia, moderate, diffuse; Heterophilic myelopoiesis, moderate	Heterophilic myelopoiesis, moderate	NS	NS	NS	NS	NS	NS	NSF (yolk sac>)
H15	Thin, dehydrated, treated with synulox and Amikacin prior to death. Toxic heterophils on blood smear. Possible aspiratio pneumonia cause of death or due to system failure/ weakness	none		NSF (brain)	NSF (heart)	Heterophilic air sacculitis, mild, multifocal with intral-esional tophus; Pulmonary congestion, marked, diffuse, acute	Neutrophilic ventriculitis, moderate, diffuse, acute with intralesional rods; NSF (proventriculus, intestine)	Lipidic degeneration, moderate, diffuse with haematopiesis	NSF	Lymphoid atrophy, moderate, diffuse with heterophilic splenitis, mild, multifocal, acute	Heterophilic nephritis, mild multifocal with intratubular tophus	NS	NS	NSF	NSF (muscle, bone)	NS	NS	NS
H16	Overexposed to sunlight	none		NS	NS	NSF (lung)	NSF (oesophagus, gizzard, intestine)	NS	NS	NSF	NSF (kidney)	NS	NS	NSF	NS	NS	NSF (thymus, bursa)	NSF (yolk sac)
H17	Weight 173g, stopped feeding on 4/11/2014, found dead next morning	none		NSF (brain)	NSF (heart)	NSF (lung)	NSF (proventriculus, gizzard, intestine)	Lipidic degeneration, moderate, diffuse and heterophilic myelopoiesis, mild	NS	Heterophilic myelopoiesis, marked, multifocal	Heterophilic myelopoiesis, mild, multifocal	NS	NS	NS	NS	NS	NS	NS

H18	Birth weight 55.9 g, death weight 254 g, currently had about 25-28 g/ had gut contents equivalent to 2 heads in weight (crop & gizzard) died on route to hospital	none		NSF (brain)	NSF (Heart, aorta)	NSF (lung)	Heterophilic ventriculitis, mild diffuse, acute with intralesional rods; necrohaemorrhagic heterophilic and lymphoplasmacytic cloacitis and bursitis, severe, multifocal, subacute; NSF (proventriculus, intestine)	Lipidic degeneration, moderate, diffuse and heterophilic myelopoiesis, moderate, diffuse	NSF	NSF	Heterophilic myelopoiesis, marked, diffuse	NS	NS	NS	NS	Parathyroid hyperplasia, moderate, diffuse; NSF (thyroid)	Thymic lymphocytolysis, mild, multifocal; bursal lymphocytolysis, severe, multifocal	NS
H19	Yolk sac infection (1) D2, treated with antibiotics and antifungal, did not gain weight over last 5 days 66 g at death	none		NSF (brain)	NSF (heart)	NSF (air sac, lung)	NSF (gizzard, intestine)	Hepatocellular necrosis, moderate, diffuse; Heterophilic myelopoiesis, moderate	NSF	NSF	Intratubular mineralisation, mild, multifocal; Heterophilic myelopoiesis, moderate	NS	NS	NSF	NSF (muscle, bone)	NS	NS	NS
H20	Arrived as an egg in external pip from Timbavati. Hatched well, and did ok in the first day (56 g). D4 faeces wet, dehydrated (humidity increased), D5 in pain, temporary GIT stasis; D9 cough, choke, mucus in mouth, unsettled, shivering, anorexic, laboured breathing. Slow to start feeding at each feed time, had to be stimulated. Intermittent diarrhoea possibly with blood. Slow weight gain, suspected fungal stomatitis treated. Impacted, regurgitated.	Aerobic culture (Liver); Avian influenza (swabs cloaca & trachea)	Only sparse growth of mixed contaminants was isolated; No protozoa were seen; Small numbers of mixed mainly Gram-ve and coccobacilli occur in the intestinal lumina, but not in the liver.	NSF (brain)	NSF (heart)	Necrotizing heterophilic air sacculitis, mild, multifocal, acute; Pulmonary oedema, mild, diffuse, acute; NSF (Trachea)	Necrotizing heterophilic enteritis, mild, focal, acute; NSF (oesophagus, proventriculus, gizzard)	Necrotising and heterophilic hepatitis, moderate, multifocal, acute	Pancreatic atrophy, moderate	Reticuloendothelial hyperplasia moderate, multifocal with myelopoiesis moderate	Intratubular topi, moderate, multifocal	NS	NS	NS	NS	Hyperplasia, mild, multifocal (Adrenal); NSF (Thyroid)	Thymic lymphocytolysis, mild, multifocal	NS
H21	Diarrhoea for 5 days, treated Baytril	none		NSF (brain)	NSF (heart, aorta)	Pulmonary atelectasis, moderate, multifocal; NSF (trachea)	Heterophilic ventriculitis, moderate, multifocal with koilin layer mineralisation; Heterophilic enteritis, mild, diffuse, acute; NSF (proventriculus)	Heterophilic myelopoiesis and lipidic degeneration, moderate	NS	Reticuloendothelial hyperplasia, mild, multifocal	Intratubular mineralisation, mild, multifocal	NS	NS	NS	NSF (muscle, bone, cartilage)	Adrenocortical hyperplasia, moderate	NS	NSF (adipose tissue)
H22	Bird started loosing body temperature on 25/12/12, late afternoon a blockage was suspected food was made less and later completely withheld. Bird suddenly improved 26/12/12 and food was presented again. Later it deteriorated again in 27/12. duphlilac 0.05 ml was administered but the bird died an hour later.	Aerobic culture (Liver); Avian influenza (swabs cloaca & trachea)	A heavy growth of Enterococcus faecalis; Negative for avian influenza, West Nile and Newcastle's disease virus on PCR; moderate to NSF neutrophilia, regenerative erythrocyte response and monocytosis	NSF (brain, peripheral nerve)	Heterophilic epicarditis, mild, diffuse, acute	Congestion and pulmonary oedema, severe, diffuse, acute; NSF (trachea)	NSF (oesophagus, proventriculus, gizzard, intestine)	Periacinar hepatocellular necrosis, moderate; heterophilic myelopoiesis mild, diffuse	Atrophy, marked, diffuse	Heterophilic myelopoiesis, marked, multifocal	Intratubular topi, mild, multifocal; Heterophilic myelopoiesis, mild	NS	NS	Heterophilic dermatitis moderate, diffuse, acute with intralesional cocci	NS	Adrenocortical hyperplasia, marked, diffuse; Parathyroid hyperplasia, moderate, diffuse	Lymphoid atrophy, marked, diffuse with lymphoid necrosis (Bursa);	NS

H23	eyes sunken in, blood smelly mucous faeces	Aerobic culture (liver)	Two contaminants or opportunist: E. coli and Citrobacter workmanii; Gram stain showed no bacteria in the inflammed tissues; Lung impression smear non-diagnostic	NSF (brain)	NSF (heart)	Heterophilic and fibrinous air sacculitis, moderate, diffuse; NSF (lung)	NSF (oesophagus, proventriculus, gizzard, intestine)	Heterophilic and necrotising hepatitis, mild, multifocal, acute with lipidic degeneration, moderate, diffuse; Heterophilic myelopoiesis, mild, multifocal	Heterophiliz myelopoiesis, mild, multifocal	Fibrinonecrotic and heterophilic splenitis, marked, multifocal, acute	Intratubular tophus, mild, multifocal	NS	NS	NSF	NS	NSF (Adrenal, Thyroid, parathyroid)	Lymphoid atrophy, marked, diffuse (Bursa); NSF (Thymus)	NS
H24	Collected from nest 9th January; very dehydrated. Rehydrated and moved to the zoo on the 10th. Eating well, and moved to JHB zoo on the 22nd. Feeding reduced and moved to queit environment. Suspected impacted on the 26th, treated with duphalac, fluids and synuloNS. Poor condition, steady decrease in habitus. Possible impaction since 21st	Bacterial culture (brain, intestine)	a few contaminants, as well as somewhat more colonis of Campylobacter, closest to C. hyointestinalis (an as yet unnamed Campylobacter from Canadian geese)	Brain, cerebellum: Congestion, moderate, diffuse	NSF (Heart)	Pulmonary congestion, moderate, diffuse; NSF (Trachea)	NSF (Oesophagus, proventriculus, gizzard, intestine)	Hydropic and lipidic hepatocellular degeneration, severe, diffuse; Gall blader: NSF	NSF	NSF	Degeneration and tubular necrosis, acute, mild, multifocal	NS	NSF (ovary)	NS	NS	NSF (Adrenal gland)	NS	NS
H25	about 1 week old-treated for septicemia responded well, treated with antibiotics/ antifungals until end of last week. Collapsed & died yesterday	Bacterial culture (Liver)	Heavy growth of E. coli was isolated	NSF (brain, peripheral nerve)	NSF (heart)	NSF (lung, trachea)	Necrotizing enteritis and proctitis, acute, segmental, moderate with bacterial rods in crypts; sturdy bacterial rods in slightly oedematous superficial gizzard koilin layers	Fibrinonecrotic hepatitis, moderate, multifocal with intralesional rods	Pancreatic atrophy, moderate	Fibrinonecrotic splenitis, mild, multifocal with intralesional rods	Heterophilic interstitial nephritis, mild, multifocal with tubular necrosis, mild, segmental	NS	NS	NSF	NS	Adrenocortical hyperplasia, marked, multifocal; Parathyroid hyperplasia, moderate	Lymphoid depletion, diffuse, marked and acute heterophilic bursitis with intraluminal rods	NS
H26	Chick regurgetated last feed in pm at 18h00- looked fine. Died during the night	Gram on A	Stains were negative		NSF (heart)	NSF (lung)	NSF (proventriculus, gizzard, intestine)	Myeloposiesis, mild, multifocal,	NSF	NSF	NSF	NSF	NS	NSF	NSF (bone, muscle)	NS	NS	NS

H27	<p>At 14h00 feed on 04/01/2007 it did not eat all the food and seemed a bit lethargic, still had good begging response and good faecal. The stomach area seemed a bit tight . It was given 2 cc water at 20h00 and 2 cc ringers lactate at 23h00. At 06h00 feed on 05/01/2008 it was lying down, refusing to sit up with no begging response at all. Its head turned to the side and showed signs of very laboured breathing. Lots of faecal was present from overnight (included in a seperate package). SynuloNS (antibiotic) was administered at 06h30am (05/01/2008). The bird showed no improvement and still laboured breathing. Although Nonyas eye-slits were very visible the chick still had no sight (no reaction to movement of light) at day 25, which seems a bit out of ordinary. Nonya's sibling (Mandla) which 4 days younger, also got sick. It regurgitated its food on 03/01/2007 and was lethargic and started to show signs of laboured breathing. This chick was also put onto antibiotics and has so far survived. It showed slight improvement and ate 10g food on 05/01/2007. It also has a weak begging response and is trying to sit up when offered food.</p>	<p>Aerobic culture (liver)</p>	<p>A spares mixed growth, chiefly rough E. coli, was isolated</p>	<p>Necrohaemorrhagic and heterophilic encephalitis and ventriculitis, mild, diffuse, acute; NSF (peripheral nerve)</p>	<p>NSF (heart)</p>	<p>Pulmonary congestion, moderate, diffuse; NSF (Trachea)</p>	<p>NSF (oesophagus, proventriculus, gizzard, intestine)</p>	<p>Congestion and haemopoiesis, moderate, multifocal</p>	<p>NSF</p>	<p>Fibrinonecrotic and heterophilic splenitis, multifocal, moderate, acute with intralesional rods</p>	<p>Haematopoiesis, moderate, multifocal</p>	<p>NS</p>	<p>NSF (testis)</p>	<p>NSF</p>	<p>Rickets; NSF (Muscle)</p>	<p>Adrenocortical hyperplasia, mild, multifocal; NSF (Thyroid)</p>	<p>Lymphoid atrophy, marked, diffuse (Bursa); NSF (Thymus)</p>	<p>NS</p>
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H28	Weight loss 2-3 days; vomiting 1/2/09 put on bytril. Brought to zoo; rehydrated (orally) & fed following day but vomited on Tuesday morning (back to food from Saturday) & thereafter confirmed to regurgitate/ vomit; NSrayed? Impaction/ dehydration/ calcium deficiency/ starvation?	aerobic culture (liver)	Only a heavy growth of E.coli was isolated. E. coli would only be an opportunist in this case	NSF (brain, peripheral nerve)	NSF (heart)	NSF (lung)	Necrotizing proven-triculitis and ventriculitis, moderate, focal, acute with intralesional rods; atrophic enteritis, moderate, segmen-tal, subacute; NSF (Oesophagus)	Congestion and atrophy, mild, multifocal; myelopoiesis, moderate, multifocal	NSF	NSF	Intratubu-lar tophus, moderate, multifocal with myelopoiesis, moderate, multifocal	NS	NSF (testis)	NSF	Rickets; NSF (muscle)	NSF (thyroid, parathyroid, adrenal)	Thymic lymphone-crosis and atrophy, moderate, multifocal; Bursa: Lymphoid atrophy, marked, diffuse	NS
H29	Weight 1 kg; unable to walk, dyspoic. Died within 1 hour of admission. Bones very soft and deformed .	none		NS	NSF (heart)	Pulmonary congestion and oedema, moderate, diffuse, acute	NSF (Gizzard)	Heterophilic myelopoiesis, marked	NS	Reticuloen-dothelial hyperplasia, moderate, multifocal and heterophilic myelopoiesis, marked	Tubular degeneration, mild, diffuse	NSF	NS	NS	Rickets and fibrous osteodystro-phy; skeletal muscle necrosis, moderate, focal, acute	NS	NS	NS
H30	Evening meal started shaking, labored breathing the next morning. Lethergic , stopped eating , gave...to hydrate but bird became more lethargic and died before we could get it to a vet.	Aerobic culture (Liver)	Heavy growth of E. coli (opportunist) was isolated	NSF (brain)	Fibrinonecrotic epicarditis, severe, diffuse, acute	Fibrinonecrotic to granulomatous bronchopneu-monia, moderate, multifocal with intralesional rods; NSF (Traquea)	Epithelial hyperpla-sia, marked, segmen-tal with intralesional <i>Cryptosporidium</i> ; <i>NSF (oesophagus, proven-triculus, gizzard)</i>	Fibrinonecrotic hepatitis and serositis, moderate, multifocal, acute with intral-esional rods	Pancreatic atrophy, moderate	Necrotic spleni-tis, moderate, multifocal	Intratubu-lar tophus, moderate, multifocal	NS	NS	NSF	Rickets; NSF (muscle)	Adrenocortical hyperplasia moderate, multifocal; Parathyroid hyperplasia, moderate, diffuse; NSF (Thyroid)	NSF (Thymus)	NS
H31	Dehydrated, emaciated	none		NS	NSF (heart)	NSF (lung)	Necro haemorrhagic and heterophilic enteritis,moderate, diffuse with intralesional fungal hyphae; NSF (proventriculus)	Lipidic degeneration, mild, diffuse; heterophiliz haematopoiesis, mild	Heterophilic necrotizing pancreatitis, moderate, multifocal, subacute with intrale-sional yeasts; Lympho-cytic and heterophilic peripan-creatic, perovascular steatitis and vasculitis, multifocal, subacute	Heterophilic haematopoiesis, moderate	Tubular necrosis, moderate, multifocal, acute; Heterophiliz haematopoiesis, mild	NS	NS	NS	NS	NS	NS	NSF (yolk sac)
H32	Chick was very small and sickly struggled to put on weight. Was on antibiotics (synuloNS) until 15/01/2008 had faecal but a poor begging Response the morning he died.	Aerobic culture (lung)	Mixed growth of Salmonella typhimurium	NSF (Brain, peripheral nerve)	Fibrinonecrotic pericarditis, severe, diffuse, acute with intralesional bacteria; Myocardial fibrosis perivas-cular, moderate	Pulmonary congestion and oedema, severe, diffuse with atelecta-sis moderate, multifocal; Fibrinonecrotic air sacculitis, moderate, diffuse, subacute with intralesional bacterias; NSF (Trachea)	NSF (oesophagus, proventriculus, gizzard, intestine)	Congestion and myelopoiesis, moderate, multifocal	NSF	Fibrinon-ecrotic splenitis, multifocal, moderate, acute with intralesional bacteria with reticuloendothe-lial hyperplasia, moderate, multifocal	Proliferative glomerulone-phritis, mild, multifocal with abundante intratubular tophus	Hetero-philic myelopoie-sis	NS	NSF	Mild rickets	NSF (Thyroid)	Lymphoid atrophy, marked, diffuse (Bursa); NSF (Thymus)	NS
H33	Depressed, Ecoli infection, treated for 10 days with baytril and syniloNS, was on lv fluids. Died	Electron micros-copy (pancreas)	No viral particles seen	NS	Myocardial necrosis, mild, multifocal, acute	NS	NSF (oesophagus, proventriculus, gizzard, intestine)	Myelopoiesis, mild	Necrotiz-ing and heterophilic pancreatitis, marked, multifocal, acute	Lymphoih atrophy, marked	Tubular necrosis, mild, multifo-cal, acute; myelopoiesis, mild	NS	NS	NS	NS	NS	NS	NS

H34	Last seen Saturday night, fed & seemed normal found dead Sunday morning	Aerobic culture (spleen); Avian Influenza (Swab (cloaca & trachea)	No bacteria isolated;	NSF (brain, peripheral nerve)	NSF (heart)	NSF (trachea, lung)		Congestion, moderate, diffuse	Congestion, mild, diffuse	Congestion, moderate, diffuse	Congestion, marked, diffuse	NS	NS	NSF	NSF (muscle)	Lymphocytic thyroiditis, moderate, multifocal, subacute; Parathyroid hyperplasia, moderate; NSF (adrenal)	Bursal lymphoid regression, moderate; NSF (thymus)	NS
H35	Chick was due to stand at 86 but had difficulty standing. Chick was put on a course of metacam and canason for 10 days. Its feet were bandaged at PTA zoo to keep them in the right position- the bird never walked, had difficulty standing.	Aerobic culture (spleen); Avian Influenza (Swab (cloaca & trachea)	Only mixed contaminants, no salmonella:	NSF (brain); Wallerian degeneration and lymphoplas-mocytic neuritis mild, multifocal	NSF (heart, aorta)	NSF (lung, trachea)	Oedema of the gizzard koilin layer, moderate, diffuse; NSF (intestine)	Hydropic degeneration, mild, diffuse; Haematopoiesis, mild, peroportal	NS	Congestion, moderate, diffuse	NSF	NS	NS	NSF	Muscle fibre degenera-tion, mild, diffuse	Parathyroid hyperplasia, moderate, diffuse; NSF (thyroid)	Lymphoid atrophy, marked, diffuse (thymus)	NS
H36	Dehydrated chick on arrival	none		NSF (spinal cord, brain)	NSF (heart)	NSF (sinuses, trachea, lung, air sac)	Heterophilic ventriculitis, moderate, diffuse with intralesional rods; NSF (oesopha-gus, intestine)	Lipidic degeneration, mild, diffuse; heterophilic myelopoiesis, mild	NSF	NS	Heterophilic myelopoiesis, mild, multifocal	NS	NS	NSF	NSF (muscle, bone)	NSF (adrenal gland)	Bursal and thymic lymphoid atrophy, marked, diffuse	Mineralisation of the yolk sac, mild, multifocal; NSF (ear)
H37	Harvested too late	none		NS	NSF (heart)	NSF (trachea)	NSF (oesophagus, proventriculus, gizzard, intestine)	NS	NS	NSF	Intratubular tophus, mild, multifocal	NS	NS	NSF	NS	NS	NS	NS
H38		none		NSF (brain)	NS	Pulmonary congestion, severe, diffuse	Superficial koilin erosion, moderate	Cholestasis, moderate, diffuse	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
H39	No history	none		NS	NSF (heart)	Heterophilic and lympho-cytic interstitial pneumonia, mild, diffuse, subacute	Mineralisation of gizzard koilin layer, mild; NSF (intestine)	Hematopoie-sis, moderate; Hydropic and lipidic degenera-tion, moderate, diffuse	NS	Hematopoiesis, moderate	Hematopoie-sis, moderate; Hydropic tubular degeneration, moderate, segmental	NS	NS	NS	NS	NS	NS	NSF (eye)
H40	Liver failure due to cholestasis		No blood smear taken	NSF	NSF	NSF	NS	Atrophy; cholestasis; heterophilic myelopoiesis	NSF	Haemosiderosis; reactive	Degenereation	NS	NSF	NS	NS	NSF	NSF	NS

NS, not sampled; NSF, no significant findings