

Supplementary Table S1. Summary of studies reporting occurrence and detection of haemoparasites in poultry in sub-Saharan Africa between 1970-2021.

Reference	Objective (s) of study	Host studied	Haemoparasite species reported	Outcomes of the study	Country of study
Jubril et al., 2021	To evaluate the incidence of haemoparasites in commercial quails and their associated haematology changes.	Quails	<i>Haemoproteus</i> spp., <i>Plasmodium gallinaceum</i> , <i>Leucocytozoon</i> spp.	<ul style="list-style-type: none"> - <i>Haemoproteus</i> spp., <i>Plasmodium gallinaceum</i>, <i>Leucocytozoon</i> spp. were identified - <i>Haemoproteus</i> spp. was the most abundant, followed by <i>Leucocytozoon</i> spp. - 29 (51 %) quails were positive for single infection while 9 (16 %) were positive for mixed infection - The results showed that there is a high occurrence of haemoparasitic infection in apparently healthy quails 	Nigeria
Lawal et al., 2021a	To determine the emerging avian haemosporidian infections in Village chickens in Yobe State, Nigeria using microscopy.	Chickens	<i>Plasmodium</i> spp., <i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> spp. was the most commonly detected blood parasite infecting village chickens - Mixed infection by <i>Plasmodium</i> spp. and <i>Haemoproteus</i> spp. was detected in chickens. - A higher prevalence was observed in males (9.9 %) compared to female (4.0 %) village chickens. - Avian haemosporidian infections were higher in adult chickens (10.4 %) than in the growers (3.4 %) 	Nigeria
Lawal et al., 2021b	To determine the genera of haemoparasites that causes avian malaria in village chickens in Gombe Local Government Area of Gombe State, Nigeria.	Chickens	<i>Plasmodium</i> spp., <i>Haemoproteus</i> spp., <i>Leucocytozoon</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> spp., <i>Haemoproteus</i> spp. and <i>Leucocytozoon</i> spp. were detected in single or mixed infections - <i>Plasmodium</i> spp. was the most abundant parasite infecting chickens, followed by <i>Haemoproteus</i> spp. and <i>Leucocytozoon</i> spp. was the least parasite detected -Mixed infections were observed between <i>Plasmodium</i> spp. and <i>Haemoproteus</i> spp. -The prevalence rates of reported haemoparasites were higher during the rainy season as compared to the dry season 	Nigeria
Lawal et al., 2021c	To determine the prevalence of avian haemosporidian parasites in village chickens in Kwami, Gombe State, Nigeria.	Chickens	<i>Plasmodium</i> spp., <i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> was the most prevalent species (11.8 %) compared to <i>Haemoproteus</i> species (6.6 %) - Prevalence of avian haemosporidian infections were higher in males (13.9 %) as compared to hens (6.9 %), also in adults (14.5 %) than growers (6.4 %) - The prevalence of infection was higher during the rainy season (15.6 %) compared to the dry (5.2 %) 	Nigeria

Nebel et al., 2020	To assess blood parasite diversity by PCR screening for <i>H. columbae</i> lineages and by sequencing a section of the mitochondrial cyt b gene.	Pigeons	<i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - <i>Haemoproteus</i> spp. was the only detected species infecting pigeons - High number of pigeons were infected with more than one <i>Haemoproteus</i> parasite lineage - 6 of 192 all examined blood smears did not show any infection with haemoparasites based on the blood smear screening, however, four of these samples tested positive through molecular analysis. 	South Africa
Wamboi et al., 2020	To determine parasitic prevalence and probable haemato-biochemical changes that may occur from parasitic infections in marketed indigenous chickens in Kiambu county, Kenya.	Chickens	<i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp., <i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Leucocytozoon</i> spp. and <i>Plasmodium</i> spp. infections were found in all chickens examined - <i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp. and <i>Plasmodium</i> spp. were found as three mixed infections - <i>Haemoproteus</i> spp. was the least encountered parasite in chickens studied 	Kenya
Idowu et al., 2019	To determine the prevalence and intensity of <i>Eimeria</i> spp. and haemosporidian infections of domestic chickens and helmeted guinea fowls sold at selected LBMs in Lagos State.	Chickens and Guinea fowls	<i>Plasmodium</i> spp., <i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - Domestic chickens were infected by <i>Plasmodium</i> spp., <i>Leucocytozoon</i> spp. and <i>Haemoproteus</i> spp. - Guinea fowls were only infected by <i>Plasmodium</i> spp. and <i>Haemoproteus</i> spp. - More <i>Plasmodium</i> spp. infection were observed in male guinea fowls (26 %) compared to female (6 %) guinea fowls 	Nigeria
Lawal et al., 2019	To detect haemosporidians from the blood of Muscovy ducks in Gombe State Nigeria.	Ducks	<i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp., <i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Leucocytozoon</i> spp. was the most abundant (5.57 %) haemoparasite, followed by <i>Haemoproteus</i> spp. (2.16 %) and <i>Plasmodium</i> spp. (0.68 %) were the least detected. - Female ducks showed high prevalence of haemoparasites (18.54 %) compared to male ducks (13.58%) - The highest prevalence infections were observed in the rainy season (24.55 %) than in the dry season (7.27 %) 	Nigeria
Mohammed et al., 2019	To determine the haemo- and endoparasites of local chickens reared in Gwagwalada Area Council, Abuja.	Chickens	<i>Plasmodium</i> spp., <i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> spp. was the most abundant (54.6%), followed by both <i>Leucocytozoon</i> spp. and <i>Haemoproteus</i> spp (0.9 %) - The occurrence of haemoparasites infections were higher in females (53.1 %) compared to males (46.9 %) 	Nigeria
Nakayima et al., 2019	To investigate the distribution, prevalence and diversity of haemosporidian parasites in free-ranging domestic birds in Uganda, East Africa	Chickens, ducks, turkeys, guinea fowls	<i>Haemoproteus</i> spp., <i>Plasmodium</i> spp., <i>Leucocytozoon</i> spp.	<ul style="list-style-type: none"> - Chickens were infected by <i>Haemoproteus</i> spp., <i>Plasmodium</i> spp., <i>Leucocytozoon</i> spp. - <i>Plasmodium</i> spp. was the most abundant, followed by <i>Haemoproteus</i> spp., and <i>Leucocytozoon</i> spp. was the least detected in chickens. 	Uganda

				<ul style="list-style-type: none"> - Ducks, turkeys, and guinea fowls were only infected with <i>Haemoproteus</i> spp. and <i>Plasmodium</i> spp. - Mixed infections of <i>Haemoproteus</i> spp. and <i>Plasmodium</i> spp. was detected in chicken, ducks, turkey, guinea fowls 	
Ogbaje et al., 2019	To investigate the occurrence, prevalence and some possible risk factors in the study area to sensitize and provide some guidance to the experts in designing effective control programme against those parasitic infections for poultry farmers in the area	Chickens	<i>Plasmodium</i> spp., <i>Haemoproteus</i> spp., <i>Leucocytozoon</i> spp.	<ul style="list-style-type: none"> - Only <i>Plasmodium</i> spp., <i>Haemoproteus</i> spp. and <i>Leucocytozoon</i> spp. were found in the chickens - <i>Plasmodium</i> spp. was the most commonly detected species in broiler chickens (21.6 %), followed by <i>Haemoproteus</i> spp. (0.8 %) and <i>Leucocytozoon</i> spp. (0.8 %) - The prevalence was higher in local chickens (23.16 %) compared to that of broiler chickens (21.60 %) - The infections were more in male chickens (27.2 %) than in female chickens (26.1 %) 	Nigeria
Waruiru et al., 2017	To determine the prevalence of endo- and haemoparasites in different age and sex groups of free-range local ducks in Nairobi and its environs.	Ducks	<i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - Blood smear revealed the presence of only two haemoparasites (<i>Leucocytozoon</i> spp., <i>Haemoproteus</i> spp.) in ducks 	Kenya
Lawal et al., 2016	To determine the prevalence and type of avian haemoparasites parasitizing village chickens in Maiduguri, Northeastern Nigeria and to provide data that can serve as reference in future research on village chickens in the study area.	Chickens	<i>Haemoproteus</i> spp., <i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Haemoproteus</i> spp. and <i>Plasmodium</i> spp. were the only haemoparasites detected from the examined chickens - <i>Haemoproteus</i> spp. was the most abundant compared to the <i>Plasmodium</i> spp. - 17 % (34/200) chickens were positive for haemoparasite infections - Mixed infections by two species was detected in village chickens 	Nigeria
Maxwell et al., 2016	To investigate the prevalence of haemoparasites of chickens in Owerri, southeastern Nigeria and to validate the scanty studies carried out in this part of the country.	Chickens	<i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> infections were more in exotic chickens (66.7 %) compared to local chickens (33.3 %) - <i>Plasmodium</i> spp. infections in exotic chickens were more in cocks (62.5 %) compared to hens (37.5 %) - In the infected local chickens, the hens were more infected (85.7 %) than the cocks (14.3 %). 	Nigeria
Chege et al., 2015	To establish parasite types and intensity in village chicken of Mbeere Sub-County in dry and wet seasons.	Chickens	<i>Plasmodium gallinaceum</i> , <i>Leucocytozoon schoutedeni</i>	<ul style="list-style-type: none"> - <i>Plasmodium gallinaceum</i> was the most common haemoparasite detected - The incident rates of were more during the wet season (79.2 %, 19/24) compared to the dry season (62.5 %, 15/24) 	Kenya

Opara et al., 2014	-	Chickens and turkeys	<i>Leucocytozoon</i> spp., <i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Leucocytozoon</i> spp. was the only blood parasites found in chickens with a prevalence rate of 448 (8.9 %) occurring in both male and female chickens - Only <i>Plasmodium</i> sp. was found in the turkeys with a prevalence of 224 (40 %) - Blood infection was higher in the male chickens (18.2 %) as compared to the female chickens (5.9 %) 	Nigeria
Sam-Wobo et al., 2014	To determine malaria parasites and packed cell volume on free range poultry in Abeokuta.	Chickens	<i>Plasmodium gallinaceum</i>	<ul style="list-style-type: none"> - Only <i>Plasmodium gallinaceum</i> was detected from the chickens - Infections were more in 8 % females than males (5 %) - Highest prevalence was observed in chickens with packed cell volume (PCV) range of 21-25 had the highest prevalence (38.46 %), followed by those with PCV range of 16-20 (30.76 %) 	Nigeria
Opara et al., 2012	To determine the blood characteristics, prevalence of gastro-intestinal and haemoparasites of street pigeons in Owerri.	Pigeons	<i>Haemoproteus</i> spp., <i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> spp. and <i>Haemoproteus</i> spp were detected - <i>Haemoproteus</i> spp was the most dominant compared to <i>Plasmodium</i> spp. - 80 % (120 of 150) of pigeons tested positive - Infection being high in female chickens (66.7 %) than in male chickens (33.3 %) 	Nigeria
Usman et al., 2012	To determine the prevalence of ecto and haemoparasites of chickens in Sokoto metropolis.	Chickens	<i>Plasmodium gallinaceum</i>	<ul style="list-style-type: none"> - Only one species of haemoparasites was detected from the examined free-range chickens, <i>Plasmodium gallinaceum</i> - <i>Plasmodium gallinaceum</i> was detected from 12 of 100 free range chickens. 	Nigeria
Sabuni et al., 2011	To determine the type and prevalence of haemoparasites infection in indigenous free-ranging village chickens in two different agro-ecological zones in Kenya.	Chickens	<i>Plasmodium gallinaceum</i> , <i>Leucocytozoon schoutedeni</i> , <i>Haemoproteus</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium gallinaceum</i>, <i>Leucocytozoon schoutedeni</i> and <i>Haemoproteus</i> spp. were found infesting poultry - <i>Plasmodium gallinaceum</i> was the most and <i>Haemoproteus</i> spp. was the least encountered haemoparasite infesting chickens - 71 (62.3 %) of infected chickens had single infection, while 43 (37.7 %) were infected by more than one genus of haemoparasites - <i>Leucocytozoon schoutedeni</i> showed an increase in prevalence rate with increase in age of the chicken. 	Kenya
Msoffe et al., 2010	To gauge the occurrence of parasites (endoparasites, ectoparasites and blood) of pigeons in Morogoro Municipality of Tanzania.	Pigeons	<i>Haemoproteus columbae</i>	<ul style="list-style-type: none"> - Both nesting and adult pigeons were infected by the haemoparasite species, <i>Haemoproteus columbae</i>. - Results showed that, <i>Haemoproteus columbae</i> was higher in adult pigeons compared to the nesting pigeons. 	Tanzania
Igbokwe et al., 2008	-	Chickens and	<i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Plasmodium</i> was the only detected haemoparasite in chickens and Guinea fowls 	Nigeria

		guinea fowls		<ul style="list-style-type: none"> - Infection observed in domestic chickens and Guinea fowls suggested that avian malaria was prevalent in this environment - Infections increased with increasing rainfall - <i>Plasmodium</i> infection in chickens did not decrease their PCV 	
Sehgal et al., 2006	To study the prevalence and morphology of 2 distinct morphospecies of the chicken blood parasites <i>L. schoutedeni</i> and <i>T. gallinarum</i> , and assign DNA sequence information to them.	Chickens	<i>Leucocytozoon schoutedeni</i>	<ul style="list-style-type: none"> - Chickens were infected by <i>Leucocytozoon schoutedeni</i> only - The chickens from this study were collected from several habitats where biting midges and mosquitoes occurs in high numbers. - Therefore, absence of <i>Plasmodium</i> and <i>Haemoproteus</i> spp. infections of these birds was unexpected. 	Cameroon and Uganda
Illango et al., 2002	To develop integrated and appropriate health management interventions targeting rural poultry production in two agro-ecological zones of Uganda	Chickens	<i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - The blood smears indicated the presence of only <i>Plasmodium</i> spp. in both dry and wet seasons. 	Uganda
Permin et al., 2002	To describe the prevalences of parasitic infections and infestations in free-range village chickens in the Goromonzi District in Zimbabwe.	Chickens	<i>Leucocytozoon sabrazesi</i> , <i>Plasmodium gallinaceum</i> , <i>Trypanosoma avium</i>	<ul style="list-style-type: none"> - 32% were infected with haemoparasites. - Prevalence's (%) of haemoparasites in young and adult chickens were: <i>Leucocytozoon sabrazesi</i> (3; 1), <i>Plasmodium gallinaceum</i> (8; 6) and <i>Trypanosoma avium</i> (2; 3), respectively. 	Zimbabwe
Mushi et al., 2000	To determine the presence of endo, ecto- and haemoparasites of pigeons, some of which may be of zoonotic importance.	Pigeons	<i>Haemoproteus columbae</i>	<ul style="list-style-type: none"> - <i>Haemoproteus columbae</i> was the most common blood parasite found on pigeons. - The parasite was not associated with clinical disease. 	Botswana
Poulsen et al., 2000	To determine the species and their prevalences of gastro-intestinal helminths and haemoparasites in scavenging chickens in the upper eastern region of Ghana, West Africa.	Chickens	<i>Plasmodium juxtannucleare</i>	<ul style="list-style-type: none"> - The parasites collected in this study was <i>Plasmodium juxtannucleare</i> - It was surprising that <i>Leucocytozoon</i> species were not detected in domestic chickens studied, as it is commonly found in the blood of domestic chickens 	Ghana
Dranzoa et al., 1999	To determine the prevalence of ecto-, gastro-intestinal- and haemo-parasites of pigeons.	Pigeons	<i>Haemoproteus</i> spp. <i>Plasmodium</i> spp.	<ul style="list-style-type: none"> - <i>Haemoproteus</i> spp. and <i>Plasmodium</i> spp. were the only blood parasites infecting pigeons - <i>Haemoproteus</i> spp. was the most abundant specie (76.5 %) than <i>Plasmodium</i> spp. (29.4 %) - Mixed infections by <i>Haemoproteus</i> spp. and <i>Plasmodium</i> spp. were detected in 10 pigeons 	Uganda

Mushi et al., 1999	-	Pigeons	<i>Haemoproteus columbae</i>	<ul style="list-style-type: none"> -The erythrocytes of high proportion (75 %) of health pigeons were parasitized by <i>H. columbae</i> gametes. - The blood parasite was identified as <i>H. columbae</i>. - The high prevalence could be attributed to the presence of blood sucking vector flies. 	Botswana
Earle, 1993a	To investigate inter-specificity and intraspecific host-parasite and distributions of avian haematozoan in various game birds in southern Africa	Guinea fowls	<i>Haemoproteus pratasi</i> , <i>Leucocytozoon neavei</i>	<ul style="list-style-type: none"> - The overall infection rate of haemoparasites in guinea fowls was 52.2 % - The species <i>Haemoproteus pratasi</i> and <i>Leucocytozoon neavei</i> were present in 3 different sampling locations 	Zambia and Zimbabwe
Earle, 1993b	To determine which blood parasites occurred in mixed flocks of feral and rock pigeons and to investigate if prevalence of parasite infection or parasite burdens varied between those two closely related but ecologically differentiated, host species.	Pigeons	<i>Haemoproteus columbae</i> , <i>Leucocytozoon marchouxi</i>	<ul style="list-style-type: none"> - <i>Haemoproteus columbae</i> was the most abundant species infecting pigeons - The infection of <i>Haemoproteus columbae</i> was greater in females than in males only in feral pigeons - The infection of <i>Haemoproteus columbae</i> was independent of host-sex in the rock pigeons. - <i>Haemoproteus columbae</i> was higher in feral pigeons (73 %) as compared to rock pigeons (12 %) 	South Africa
Earle et al., 1991	-	Guinea fowls	<i>Haemoproteus pratasi</i> , <i>Hepatozoon</i> spp., <i>Leucocytozoon neavei</i> , <i>Plasmodium circumflexum</i> , <i>Trypanosoma numidae</i>	<ul style="list-style-type: none"> - Guinea fowls were infected by parasites from five families and genera of haemoparasites. - <i>Leucocytozoon neavei</i> was the most abundant parasite (56 %), followed by <i>Haemoproteus pratasi</i> (49%). - <i>Plasmodium circumflexum</i> (3.5 %), <i>Trypanosoma numidae</i> (2.5 %) and <i>Hepatozoon</i> sp. (1.0 %) were recorded in less numbers. 	South Africa
Fallis et al., 1973	-	Chickens and guinea fowls	<i>Leucocytozoon schoutedeni</i>	<ul style="list-style-type: none"> - More than 50 % of the examined chickens were infected by <i>Leucocytozoon schoutedeni</i> - Blood smears from guinea fowls showed the presence of <i>Leucocytozoon schoutedeni</i> 	Tanzania