1. COURSE NAME & CREDIT LOAD
COURSE CODE: WRM 502
COURSE TITLE: Ornithology
NUMBER OF CREDITS: 3 Credits
COURSE DURATION: Three hours per week for 12 weeks (36 hours)
As taught in (2009/2010) session (2 hrs for Lectures and 1 hr for Practicals).

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3. COURSE DETAILS
3.1 Course Synopses:
Classification, structure, ecology and economics of birds and avifauna of Africa, distribution and identification of game birds, management techniques.

3.2 Course note:

WRM 502

Management of Game Bird: ORNITHOLOGY

Importance of ornithology

(a) Ecological indicator (b) Scavengers, (c) Seed dispersal

Why do we study Birds

(1) They are integral part of ecosystem: takes part in food chain

(2) They are excellent environmental indicators

(3) They help in environmental or habitat quality

(4) They are used for food resources:- Good in protein and low in cholesterol, the eggs are nutritious.

(5) Pest control e.g. They feed on insects.

(6) Pollinators of flowers

(7) They serve as seed dispersal

(8) They serves as messengers.

(9) Good in food cathers esp falcon, hawks

(10) They are used to protect planes from bird strikes

(11) They are good for honey guides

(12) They are source of fertilizer:- The dropping of sea birds are rich in phosphate and the dropping is called “Guano”

(13) They are good for pleasure

(14) They good for art and culture

(15) The feathers are used for decoration, for dressing pillow, attires, cushions

(16) Because of their negative economic importance

BIRD ORIGIN AND EVOLUTION

They belong to phylum vertebrate. They probably involve small light boned warm blooded reptiles that ran on their hind legs. The 1st true bind appeared between 100m years ago in the cretaceous geological age. And binds still have some of the characteristics of reptilian ancestors like scales of their legs and the way they reproduce their young by laying eggs.

Over the years birds have involved into many different forms, from the huge ostrich to the tiny sun bird and because they are warm blooded animal they able to adapt

themselves to living in climate, vary from icing and snow region of the artantic down to the hottest deserts you will see birds i.e. they are every climate.

Although they have specialized flight. They can with varying degree of skills they can crawl, walk, jump, climb, swim and dives.

FLIGHT

Birds are highly specialized flying machines they have ability to fly allows them to range widely in search of food and also to escape from predators easily. In order to fly birds, needs to be very light and so they have hollow bones cot air inside. They have bladders and so do not carry around extra water. The white of their droppings is the equivalent of urine and many bird spps eject pellet from the stomach through their mouth so that indigestible bit of foods are not carry around unnecessarily. Flying needs are great deal of energy so, birds have a large heart to pump O_2 into their blood. Air passes twice through the lungs cot heavy breath in and out so that all their available O_2 can be utilized. Their body temperature is several degree higher than in humans and feather provides excellent insulation to keep in their body heat. The principle of flight intercede for both aircraft and birds wings are thicker at the front tapering smoothly to a part at the back cot upper surface more curved and lower surface flatter. The wing shape varies according to the light style the birds. Like vultures can soar in air by spreading their huge brood wings. In summary, different types of wing shapes are:

(1) It could be long and narrow for speed e.g. swift and falcons

(2) It could be broads and long for soaring e.g. Eagle and hawk

(3) It could be short and rounded for maneuverability e.g. forest bird

THE FEATHERS

Adult birds are covered with large feathers which provide smooth body contours to lessen the air resistance in flight as well as praidx or serving excellent insulation to keep the whole body warm. They always provide protection from injury. The soft feathers underneath the contour feathers (Down feathers) and is entirely meant for insulation. Feathers must function efficiently for a bird to fly and so they had to take great care of them. How? By preening, Dusting, and water bathing. Birds have oil gland near the base of their tail which they use to keep their feathers water proofed. They rid themselves of parasite by dust bathing and is a familiar sight as seen by domestic chicken. Birds frequently take water bath before a preening section and sun bathing too. Although, feathers are very unique to birds they are made of the same materials that is found in the air, claws and hooves. A substance called keratin. The central portion of a feather is a thick is called quill is rooted in the skin of the bird cot muscles attached so that the feathers are freely movable. But on the other side of the feather is what is called vane and each vane is made of structures called barbs which linked together with tiny hooks. When a bird preens it makes sure all the hooves are link together so that the feathers are perfectly arrange for fly.

THE SENSES

(1) **For sighting:-** Bird have exceptionally good sight and have good eye in comparism with their size. The ostrich has the largest eye of any land animal. Birds can see in colour. Sight is the dominant sense for birds. Their eyes are set right in the front of their head to give them stereoscopic vision (3 dimension) which is essential to judging distance accurately especially when diving at a prey. Birds have an upper and lower eyelids which they close loan sleep but owls only

owls can blinks their eye like human. Hera, birds also have a 3rd semi transparent eyelid, the mediating membrane we they can pull owl their eye for protect from bare sunlight or dust or rain when flying.

(2) **Hearing:-** A bird hearing is also good. Bird ears are not normally visible but are set just behind their eyes and are cover with feathers. The flattered discs of feathers that surround their eye are thought to act as sound reflector.

(3) **Taste, smell and touch:-** These senses are less important to birds and most birds probably have little sense of taste of smell or taste unlike mammals. Some birds, especially wading bird e.g. whimbrels. They have sensitive beaks to probe the mud and pick up the vibration of worm which is their main food.

ADAPTATION OF BIRD TO THEIR HABITAT OR ENVIRONMENT

The habitat of a bird or animal simply means where it lives. Within each type of habitat every individual birds spp follow a life style that is slightly different from its entire neighbour and then is called Ecological niche and this enable birds to lie side by side without conflict. Birds have adapted to wide variety of foods which enhances harmony within themselves.

THE BEAKS AND FEETS

Birds have evolved different types of beaks and feet in order to cage with the varying way in we they obtain their food. However, it must be noted that although some birds rely on one source of food only others have a more varied diet.

Types of Feeding Methods

(1) Flesh Eating Birds:- Birds of prey need powerful claws (talons) with which to cease and kill prey. They also have strong hooked beaks to tear off strips of meat before swallowing it. The upper part of the beak is hooked at the tip and overlaps the lower mandible which enhances firm grip and easy tearing of meat. eg. Large eagles like Gave crowned eagle, martial eagles can tackle animals as big as monkey and they have immensely strong talons and beaks. The claws are used to kill the and by tearing it in a weak spot especially the abdomen. Vultures, needs powerful beaks for tearing though the eye of the hide of the dead animals to get the meal. The head and neck of vultures are free of feathers especially the hooded vultures so that they can trust themselves inside the carcass without getting their feathers stained.

Owls swallow their prey whole instead of tearing it, so their beaks are smaller and the feet feathered so has to deaden the noise of their flight as they pounce on their prey unsuspectedly. Others are hawk, vultures and owls.

(2) Fish eating Birds:- They have long like beaks cease a fish swimming below the surface of the water when it's caught, the bird then, turns the fish to swallow the head. They also have long legs which allow them to wade off into the water without wetting their feathers esp. herons, storks and Egrets, king fishers, fish eagles. King fishers catch fish in the massive beaks by diving from a perch or hovering above the water. Swimming and diving bird like shags and cormorants we catch fish by chasing them under water also possess hooks in the upper mandible. Their feet have webs or flaps of skins which enhance their swimming, their legs are set well back to give the maximum thrust water.

(3) Seed Eating Birds:- Birds that feeds on seed have a short but stout beak so they can crush the seed and remove the husk before eating it. e.g. Senegal fire finches, bronze manikins, fire crown or red bishop.

(4) Insect Eating Birds:- Many birds are insectivorous examples swallows bee cater, wabblers, wood peckers, swift, fly catcher, might jars.

(5) Fruits Eating Birds:- They are called frugivorous e.g Parrots, hornbills, barbets etc, They have a hooked beaks to tear, open the skin of the fruit. Their feet are specially adapted for climbing and clinging to branches to reach the fruit. They also use their feet to pick up a piece of fruit and pass it to their beaks.

(6) Nectar Eating Bird:- Example; sunbirds, humming bird of the Americans; scarlet sun bird. They have long decurved beak which is specially designed for probing the slender flower tubes for nectars or for picking small insects from the surrounding foliage of leaf.

Characteristics of Bird Behaviour

Breeding Behavior

The behaviour of bird is one of the most excitant aspects of natural history. It is during breeding season that birds are most active and therefore easier and more interesting to observe. Not only are many dressed in a bright colours or brooding plumage but also perform elaborate courtship behaviour or ritual. Some defend territory aggressively while other sing or call loudly, some build complicated nest. Just as human being dress up in their best cloth during wedding so birds put on their brightest colour plumage in the brooding season. In spp where male and female have different it's usually

a male bind we have the brighter plumage in binds display to their partner before mating takes place. All birds her some form of courtship displayed but the bird that have the most vigorous and attractive display is likely be the most dominant and fittest individual of that species, so it has the best chance of successful mating.

Birds of pray have a spectacular courtship display flying of the male may swoops up and down in the air close air wings flapping wings.

Sometimes, both partner may wheel and dive together with the female turning in over on her back locking claws with another tumbling through the air. Some male birds, will even pass food to their mate in the air we calls for precision fly as a male drop the food to (prey) and female rose over on her back in the mid air to catch it.

Benefit of courtship

- Strengthen of courtship
- Strengthen the bird.
- Also provide extra food for the female to enhance production.

Birds song is another form at courtship behaviour and ale bird will sing not only to prove it's identity so that the female will recognize his presence but also to claim its tertiary and some time many birds have favourite song post. However, when the female has laid, the female usually stop singing to avoid predators to the nest.

Nest building:- Birds have instinct to build a nest but the nest building ability improves with practice. Nest could be varies from simple structure to complex means structure. Others sometimes simply use body in the tree or deep holes in the river banks or scrape grounds and laid their eggs.

MIGRATION

The migratory bird is one of the wonders of nature. Birds travels across kilometers the long journey sometimes from African to Europe and yet not missing their destination.

Important of migration to Birds

(i) Breeding or Nestling Site.

(ii) For food

(iii) Change in weather condition (seasonal Des)

Migration is most hazardous action that bird undergo because of danger along the road many travels by night so that they can see the stars but in the night it's cloudy, they must wait until condition are alright again or looking their ways.

Before birds migrate, they eat large quantity of food to building up their body weight, to provide reserves of energy for the long journey ahead.

From Nigeria, the first major obstacle for birds traveling northward in March and April in Saharan desert. If the Oasis in the use as stopping places to replenish themselves in food and water are dried up, many birds may not survive the journey.

Another danger encounter is when they reach the sea of the mediteranian, where the hunters are waiting to shoot their arriving birds.

THE CLIMATES AND VEGETATION ZONES IN NIGERIA

Nigeria lies in tropical but between 4^{o}N and 13^{o}N of the equator, the climates is largely determined by the seasonal movement of the prevailing winds in the month of April to October could blow from the southwest bringing moist weather from the Atlantic ocean, then, from October to April the Sahara known as the "harmattan" and so this result

in the two season wet and dry season wet season in longer in the south and grows progressively shorter in the North and that result in dry region in the Northern part.

The annual rainfall varies from over 155cm in the south to less than 50cm in the up North. The south experiences a much higher level of humidity which keeps the temperature more constant whereas the North is drier cot the less cloud cover and so this called remarkable seasonal temperature. These caused much cooler weather during the harmattan period around December and January and considerably cotter weather during April and May and before the rain begins.

Vegetational zones

We can broadly defined vegetable belt into 7 vegetational belt

(1) Coastal mangrove and swamp forest

(2) Rain forest

(3) Guinea savanna

(4) Derived savanna

(5) Sahel savanna

(6) The montane belt

(7) Sudan savanna

(1) **Coastal mangrove and swamp Forest:-** The coast of Nigeria is dominated by the Niger/Delta, tidal creeks and Lagoons reaching up to 50km inland. This type of water haves spreads along the entire coast land from Badagry to Calabar but also extends so far inland in the delta area. The Lagoons and creeks are bordered by red mangrove swamp which can reach a height of 40m. Mangrove trees are specially adapted to living in an estuarine environment. They are very resistant to

salt water and there aerial roots we not only support them have ability to obtain O_2 from the air because mud makes it impossible to travel on foots and so the only access to this area is by boat. Common birds found in this area includes litu egrets, Green backed Heron, Hammer kop, blue-breasted king fishers, whimbrels, sand pipers etc. Inlands from the coastal mangroves lies in belts of fresh swamp forest which stretches up to 100km. the vegeis a mixture of Raphia palm and forest trees reaching a height of about 30m. there is got veriety of both water birds and forest birds. Birds also includes lily trotters, whitetailed hormbills, green fruit pigeon, crakes.

(2) **Rainforest belt:-** Although covered a broad belt across of while of southern Nigeria but they are now only partches of cain forest belt left but sometimes confined to Okomu rainfall rest in Edo and Urban hill (cross-river) much of the high forest has bin cut down to make way for pitation of oil palm, rubber, cocoa and fat growing exotic breeds. The crowing glayes of the rain forest are the tall hard wood timber tree like malnogany, Iroko, Sapele etc.

(3) **Derived savannah:-** Derived savannah occurs because of the effect of ontensive farming activities, deforestation and urbainization, which exposes the soil to degradation. All nutrients of the soil that are stired in the forest canopies which are felled erude the soil fertility and encourages sterility allowing mixture of secondary forest and savannah like area. This area then colonized by birds normally found only in a true savannah and sometimes forest birds. Birds types include grey hormbill, while fronted black chat, Green fruit pigeon, fly catchers, warblers and sunbirds.

(4) **Guinea/woodland savannah:-** This type of savannah is characterized by wood land broad leaved trees of about 13-17m interspersed cot grazed, if stretches from Niger-Benue river to Zaria – Bauchi. In the wet season the grass grow to between 1-2m in height but is often deliberately burnt by farmers in dry season to encourage the new growth. The tree are mainly fire to brant as the savannah are reolved because of the natural five caused by lightening. Although the trees are able to cotstd fire in the early dry season. The late dry season fire can kill many of the trees. The landscape is dolted with rocky out crops. Examples of birds found in this enot are fox keorstil, nigh jar, white crown dcliff chat etc.

(5) **Sudan savannah:-** Sudan savannah is heavily populated by human and their major occupation is farming have the natural vegetation changes gradually from broad leave to thorny species such as Acacia and Basbab tree. The grass covers most area example of bird include:- Blue-eared starling, long tailed dove, Buffalo weaver, Goshawks, little green bee-eater Queles.

(6) **Sahel Savannah:-** This is an arid region and its confined to a small area in the northern part of the country especially Jigawa. Yobe however it is increasing in size as desertification of the area continues because of felling of trees for fire wood, the overgrazing bylts sheep goats and cattle and frequently incident of drought the veg. is a mixture of. However, its increasing size as desertification of the area continues because of felling of trees out wood the over grazing of sheeps and cattle and frequent incident of drought. The veg is a mixture of spiky thorbushes and grasses cot increasing number of wind blowing sand dunes

examples of birds found include golden sparrow, Quelea, Grey dove, ant chats etc.

(7) **Montare forest:**- Is commonly found around obud and manbilla plateau in Nigeria. Montare forest is different from lowland forest because of high humidity and low temperature almost throughout the year. The trees are about 15-25m in height cot less dense canopies. The trunks of the tree are covered cot epiphytes. The climate of this envor enhance different varieties of birds spp. especially forest birds Example includes Olive pidgeons. Gilbert's babbler etc.

Birds of the Gardens and Compounds

Birds that we see most often blat choose to live besides us or around compounds are terms as birds of the garden. Example Senegal

(a) King fisher, yellow tailed birds is one of the Nigeria most colourful and conspicuous binds do bearing the name king fisher but is mostly insectirorns and it's usually found in area close to water. It's familiar birds we has a grey head and conspicuous blue and black wings at and back. The large upper mandible is red while the lower is black.

(b) Red-eyed-Dove:- It's common in the south but not too common in the North. It's plumage is more uniformly brown in colour with wine colour under part and bluey-grey head. The absence of white colour in tailed feathers help to distinguished it from laughing dove. The call of the red-eyed dove is very distinctive and the series of mole is coo-oo type can mostly easily be remembered by the phrase avoid calamity.

(c) Senegal coucal:- It is normally called Elulu. It's distribution is wide spread and it's found in variety of habita but it's commonly seen in a compound with trees and bushes providing plenty of cover. It's a medium sized bird cot a longish tail and it's often heard than seen. It's a more handsome bird cot balck head and tail, reddish brown back and whitish under part. The coucalis flight is weak and it's mova flies far and often land and gently. Others includes yellow-wagtail, village weaves, yellow white eye.

Birds of the water and water side.

The description water birds is used as a general term to describe birds found in water side area and this includes duck, Herons, egrets, lily trotters, king fishers, and waders.

Egrets or litu egret is a relatively a common bind trust wet and in Nigeria especially in dry season during migration.

The Heron:- They are smaller than egret and thick set than litu egret and have shorter lengths is commonly found around.

Although, it's seem completely white when flying but is only the wings that are white but when this are closed when land it bloorn inconspicuous brown streaked bird.

Dicks and Geese:- They are common in wetland trucut Nigeria. The Duck is identify by the black head, white face, brown black and bared flanks. They are always found in flocks and feed by dabblins on marshy grounds or open water but will occasional dive for food which consist mainly of seeds and vegetable matters.

Other bird are

- Birds of forest zone
- Birds of woodland savanna

- Birds of Dry savanna

Socio-Economic Importance of Bird / Relationship Human

- Source of protein
- Source of Egg
- Agent of pollination
- As biological control
- As pest
- As messenger

Birds collection

(1) By darting

(2) By trapping

(3) By Basting

(4) Use of Net

Why dove collect

- Research purposes
- Gene-pool preservation
- Aesthetic values
- For specimen
- For tables
- For domestication
- For census
- For Bio-medical research
- For recreational purpose
- For sport
- For Art and Culture

NECROSCOPY AND MORPHOMETRIC PROCEDURE OF A BIRD

For necroscopy

(1) Deep the carcass in water containing a disinfectant or spray it to wet the feathers.

(2) Examine the carcass for evidence of trauma and ectoparasite

(3) Place the bird on it's back and open the skin from the beak to the vents/anus

(4) Retract the skin to expose the keel and the breast muscle; the ribs, and muscles over the lower colonic cavity.

(5) Access the amount of body fat under the skin in the body cavity

(6) Open the colonic cavity by making a horizontal cut at the bottom hedge of the keel extending on ach side through the pectorial muscle and then litting the sternum.

(7) Inspect the location and the size of all organic

(8) Examine the air sacs for transparency and note any plaques or opaque area.

(9) Note any abnormal fluids using any sterile instrument, take sterile sample of any visible leisions as well as spleen, lungs and liver.

(10) Remove the tongue, tracheal, eosophagus and heart as a unit

(11) Take tyroiding land for open the trachal and heart and take samples for physiology, greastio-interstinal tracts, liver, lungs, adrenal gland, reproductive. Kidney, gonads as we move to histological study.

(12) Take samples from the large nerves between of wing

Equipment needed for microscopic samples

Necroscopit kit includes.

(1) Protective clothing:- This include rubber glove, rush boot protector, rubber apron coveralls, mask to cover mouth, and Nose and eye, Googles of face shield.

(2) Necroscopic Documentation: camera and film, film not book.

(3) Necroscopic equipment:- This include sharp knife scissors (small and large), forceps, strings, axe or matchest, laxe, small and large shears, chisels and mallets, scalpels and razor blade, alcohol lamper gass burner for sterilizing instrument, plastic ruler or measuring tape.

(4) Necroscopi container and sampling equipment:- This include tissue cassettes or tags for identification of samples, blood tube or sterileviles, plastic bags with closture tops, parafilm or sealing tape, aluminium foil, sterile syringes, and needles, labeling tapes or tags, microscopes slides and slide boxes.

(5) Disinfecting materials needed for necroscopic includes pail and brush disinfectants, borax, sodium hypochlorite and 70% ethyl alcohol.

- Safety precaution during Necrosopic operation some diseases of wllite can cause serious illness or death in human, all carcasses shud be handled as it they were harboring potentially dangerous diseases and precursor for personal safety shud be exercised. Minimal protective clothing includes coveralls, gloves and a mask that covers the nose and mouth, with boots.
- Preparing sample containers

All containers tips, slides and bags should be labeled using a water proof marker. The ffg int should be included in the label date

(1) Geographic location (park name, nearest town and country)

(2) Name of species

(3) Sex and approximate Age

(4) Person taking the records/samples

Morphomentric Measurement

Weight measurement

(1) Total length is taking from the tip of bill to the tip of the tail feather

(2) Tai length:- is taking from the base of the tail to the tip of the fail feathers

(3) Wing length

(4) Bill measurements

(5) Length of the tarsus:- is taken from the heel to the base of the digit

How do we prepare Bird skin

They are prepared by retaining the key bone of the wings legs, and skull along with the skin feather. We can store the bird in 70% alcohol or 5-10% formalin by hyeding the formalin into the muscles and body cavities or otherwise remove the organs and freeze the bird.

EFFECT OF BIRDS (Effect of human on bird Ecosystem)

(1) Farming Activities:- Application of pesticides, herbicides on land affect the activities e.g. mono-culture

a. Clearing of land

b. Application of fertilize

c. Use of mechanized tractors

d. Mono-culture

(2) Deforestation: (a) when trees where birds lay eggs or nest is destroyed (b) it exposes them to predators (c) Migration (d) loss of spp (e) Destruction of food chain (d) It affects the birds that feed on fruit.

(3) Mining

(a) Drilling

(b) Blasting:- Leads to birdanigration

(c) Gas explosion can leads to their death

(d) Destruction of landscape

(4) Hunting

(a) Reduction in size

(b) It affect Reproduction circle

(5) Bush burning

(a) Migration

(b) It destroy their home range

(c) Death

(6) Oil-exploration

(a) It can leads to loss O_2 thereby lead to fish eating birds.

(b) It affect water birds

(7) Urbanization

(a) Infrastructure of facilities

Conservation of Birds

(1) By domestication

(2) Good policy making

(3) Enacting of law

(4) Education Awareness

(5) Conservation Bird

(6) Protection of water bodies, habitats

(7) Encouragement of genetic bank.

Additional information is given as hard copy.