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A brief study on important aspects of Waterfowls belong to family Anatidae

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Abstract - Ducks, geese, and swans are members of the Anatidae biological family of aquatic birds. The family has a global distribution, with the exception of Antarctica, occurring on all of the world's continents. These birds have evolved to be able to swim and float on the water's surface. There are around 174 species in 43 genera in the family. (The magpie goose is now classified as its own family, Anseranatidae, and no longer belongs to the Anatidae.)

They are herbivorous and monogamous breeders in general. Annual migrations are carried out by a variety of species. Many animals have been tamed for agricultural purposes, while others are hunted for food and enjoyment. Since 1600, five species have gone extinct, and many more are on the verge of extinction. This paper deals with the brief study on important aspects of waterfowls belong to Family Anatidae.

Keywords - Anatidae family, Anseranatidae, waterfowls, Herbivorous, Monogamous

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GENERAL

- Waterbirds of medium to large size with fat bodies, short legs, and a flat, rounded bill.
- All regions, excluding Antarctica, are cosmopolitan.
- Various aquatic habitats, with freshwater breeding being the most common.
- There are 52 genera, 165 species, and 238 taxa in all.
- Since 1600, 41 species have been threatened, with 5 species and 3 subspecies becoming extinct.

DESCRIPTION AND ECOLOGY

Ducks, geese, and swans are small to medium-sized birds with an extended and broad body plan. [2] Diving species differ from this in that they are more rounded. The cotton pygmy goose is the smallest of the species, measuring 26.5 cm (10.5 in) and weighing 164 g (5.8 oz), while the trumpeter swan is the largest, measuring 183 cm (6 ft) and weighing 17.2 kg (38 lb). The wings are short and pointed, with powerful wing muscles that create quick beats while flying. They usually have lengthy necks, though the length varies depending on the species.The legs are short, robust, and set far back on the body (especially in aquatic species), and they have a leathery, scaly texture. This, combined with their body form, can make some species difficult to walk on land, but they are stronger walkers than other marine and aquatic birds like grebes or petrels. They usually have webbed feet, though some species, such as the Nene, have lost their webbing through time. The bills are constructed of soft keratin with a thin, delicate skin covering on top (which has a leathery feel when touched). The bill shape of most animals tends to be flattened to a greater or lesser extent.The filter-feeding species have serrated lamellae that are particularly well characterised. [2]

Due to unique oils in their feathers, they are good at shedding water. Many of the ducks are sexually dimorphic, with males being brighter in colour than females (although the situation is reversed in species such as the paradise shelduck). The plumage of swans, geese, and whistling-ducks is not sexually dimorphic.Anatids are vocal birds that make a variety of quacks, honks, squeaks, and trumpeting sounds, depending on the species; the female's voice is usually deeper than the male's. [3]

SYSTEMATICS

The huge worldwide family Anatidae includes the world's 147 live species of ducks, geese, and

swans, which are frequently bundled together under the relatively imprecise title "wildfowl." The screamers (Anhimidae) of South America are their closest relatives, and the two families compose the order Anseriformes. The relationship of the Anseriformes with other bird orders is still unclear and a source of much dispute.According to some experts, the Anseriformes are the most closely linked to the Galliformes (gamebirds), with evidence of a Cretaceous common ancestor. These two orders have a lot of morphological and behavioural characteristics, but the closest relationship is in breeding biology, which includes big clutches, nidifugous young, little or no male involvement in incubation or brooding, and unstable couples. The traditional view, however, connects them more closely to the Ciconiiformes (herons, ibises, and storks) and Phoenicopteriformes (flamingos), and comprehensive investigations on the chemical makeup of egg-white proteins have backed up this theory. This family's first fossil dates from the Upper Eocene, approximately 40-50 million years ago. Among the current genera, Mergus has the earliest fossil records, which date back to the Miocene. The Anseriformes are thought to have originated in the Southern Hemisphere, as the Magpie Goose (Anseranas semipalmata), the most primitive member of the Anatidae, is limited to the Australasian Region, and its relatives, the Anhimidae, are isolated to South America.

The Anatidae family has a complicated taxonomic division that has been greatly debated and amended. The division into subfamilies and tribes is the source of the majority of the debate, but the overall number of species and the taxonomic status of the various forms are much more widely agreed upon. Many others, including F. S. Todd, have adopted J. Delacour and E. Mayr's traditional categorization of the Anatidae, which was first established by J. Delacour and E. Mayr and then amended by Delacour and then P. A. Johnsgard.

Structure and proportions; plumage of adults and young; arrangement of scales on the tarsus; voice; structure of syrinx and trachea; moult pattern; geographical distribution; and general behaviour are all elements that influence relationships within and between the Anatidae subgroups. This latter point is particularly essential since it involves species-specific courtship displays that serve to prevent interbreeding. The family is divided into three subfamilies, Anseranatinae, Anserinae, and Anatinae, according to traditional classification. To stress the contrasts in anatomy and style of life between this species and all other wildfowl, the first is designated for the primitive, aberrant Magpie Goose.The other two subfamilies approximately correlate to the wide classification of wildfowl into swans and geese (Anserinae) and ducks (Anserinae) (Anatinae). The tribes of the Anserinae are classified into four groups. The White-backed Duck (Thalassornis leuconotus), a peculiar African species formerly included with the stifftails (Oxyurini) but now generally accepted to be more closely allied to the whistling-ducks; however, some authors isolate it in its own tribe (Thalassornini) or even its own subfamily (Thalassorninae).

ASPECTS OF MORPHOLOGY

Most wildfowl spend the most of their time on the water, and their bodies are well-suited to an aquatic lifestyle. Each species, on the other hand, has its own ecological niche, ideal habitat, eating strategy, mating system, and so on, and these unique characteristics are often represented in a variety of adaptations. In many morphological aspects, most species are similar, although they differ greatly in others. Male Trumpeter Swans can grow to be over 180 cm long and have a wingspan of over 240 cm, but female African Pygmy-gooses (Nettapus auritus) are only about 30 cm long.The majority of Anatidae have a broad and extended body, with some specialist divers having a more rounder body. This distinctive body shape promotes buoyancy while also making walking on land difficult; yet, they are far more efficient on land than many seabirds. Male Anseriformes are one of the few birds that have a particular copulatory organ, comparable to the human penis, that lies inside the cloaca and is evaginated for coition by muscular action.

In all species, the neck is rather long, especially in swans and geese, but also in some ducks, and the head is small. The bill is large and conical, with serrated lamellae in the inside, which are notably well developed in plankton-filtering species, or at the cutting edges, especially in fish-eating species; the sawbills' (Mergus) bills are serrated for catching fish, and are among the most specialised. The upper mandible has a shield-shaped horny tip known as the "nail" that is tougher than the rest of the sheath and is specifically intended for grazing or mollusc-eating.In some species, such as the Comb Duck, the beak may have a prominent knob-like projection; this knob may be horny or fleshy, temporary or permanent, and may appear in males only or in both sexes; in general, it reaches its highest expression in males during the breeding season. The bill colour of many species, especially the males, is brightest during the start of the breeding season. The bills of the Blue and Pink-eared Ducks are among the most unusual in their family.

Ducks, geese, and swans have extremely strong legs with fully scaled skin. Cygnus, as well as the majority of the Aythyini, Mergini, and Oxyurini, have shorter legs. They are positioned far back on the body, especially in these tribes, which are the most aquatic of the family and have the most difficulty walking on land. In most species, the hind toe is shortened and raised, and the three forward toes are entirely linked by webs, though

in Anseranas and some Anas ducks, the webbing is just partial. The webs have shrunk in the Hawaiian Goose (Branta sandvicensis) as an adaptation to its unique environment of lava slopes on volcanic islands.Ducks, geese, and swans have a thick layer of feathers on their backs for insulation, which is especially important for birds that spend most of their time on the water. To keep their waterproofing properties, feathers must always be in good condition, and birds spend many hours each day caring for them. In this family, the oil gland is feathery and well developed. Salt glands are excretory organs in the skull that filter the blood and expel surplus salt in the form of a highly concentrated fluid that drops down the tip of the bill in all species.

RELATIONSHIP WITH HUMANS

Bedspreads, pillows, sleeping bags, and coats made of duck, eider, and goose feathers and down have long been popular. This family's members have also been utilised as food for a long time. Ducks, geese, and swans have a long history with humans; they are economically and culturally important to humans, and numerous duck species have profited from human interaction. Some anatids, on the other hand, are agricultural pests and have served as vectors for zoonoses like avian influenza.Five species of ducks have gone extinct due to human activities since 1600, while subfossil relics reveal that people were responsible for numerous extinctions in the past. Many more are now deemed endangered. Small populations (typically isolated to a single island) and island tameness were responsible for the majority of historic and prehistoric extinctions. These species lost their antipredator behaviours as well as their ability to fly as they evolved on islands without predators, making them vulnerable to human hunting pressure and imported species.

Some species, particularly geese, forage in locations that are often fairly remote from their breeding or roosting grounds. In some cases, habitat requirements change seasonally; for example, many ducks that are strictly aquatic outside of the breeding season construct their nesting grounds well inland, such as on lakes in tundra or wooded territory.

The dabbling ducks of the Anatini tribe, in general, require significantly shallower waters than the diving ducks of the Aythyini, Mergini, and Oxyurini tribes. They also prefer more gently sloping land with some vegetation around them, where they can build a nest or take sanctuary in the event of danger, and they tend to occur on smaller water bodies than ducks.

Shelducks prefer salt or brackish water, such as estuaries and mudflats, whereas sheldgeese prefer exposed grasslands, often far distant from water. Eiders and steamerducks are the most marine of the Anatidae, and they spend the most of their time along the coast. The Torrent Duck and Blue Duck are highly specialised birds that dwell along fast-flowing rivers with rapids and waterfalls; the Harlequin Duck, its Nearctic ecological counterpart, spends the winter primarily on coastal waters.The nature and kind of vegetation surrounding or emerging from water are important elements in determining whether or not a location is ideal for a specific species of wildfowl, particularly if it is to be used as a nesting site. Few species prefer open land free of vegetation along the borders of their selected body of water, and the majority of these nest on the high Arctic tundra. Most whistling ducks, shelducks, dabbling ducks, pochards, and stifftails like a reed or grass cover. Several groups of animals, notably the Cairinini's "perching ducks" and the tree-nesting Mergini, require more forested environments, and some are almost entirely reliant on tree holes for nesting.

FOOD AND NUTRITION

The broad variety of diets of wildfowl reflects their diversity. Of course, the availability of food in each location is critical, but other factors such as the balance of plant and animal matter in each, as well as the techniques for acquiring it, are generally consistent with species taxonomic classifications. Although some species are totally vegetarian and others are purely carnivorous, vegetarian diets are the most common among fully grown birds. Young chicks of most species, on the other hand, graze mostly on small animal prey items for a period of time.This is aided by the relative ease with which animal food is digested when compared to vegetable foods, as well as the increased abundance and availability of aquatic insects, mollusks, and crustaceans in the days after the chicks' hatching. Nonetheless, a few species, such as geese and swans, have a fully vegetarian diet throughout their lives.Another general rule is that wildfowl that live in estuarine or maritime environments, at any rate when in such habitats, tend to feed primarily on animal food items, particularly molluscs and crustaceans, whereas those species that occupy terrestrial habitats, and are thus distant from water for long periods, have a diet that is more vegetarian or exclusively so.

The most essential techniques of foraging for wildfowl are surface-feeding, or dabbling, diving, and grazing. They also wade, probe with their bills, sift mud, upend, sieve bottom trash, chase fish, reach for overhead grasses and seedheads, gather up acorns, chase small animals, and break up termite nests, among other things. The distinction between dabbling ducks and diving ducks is based on taxonomic differences rather than ecological differences.The Anatini typically feed by dabbling at the surface, whereas the Aythyini are known for diving foragers, therefore these tribes have been dubbed "dabbling" and "diving" ducks, respectively.Species, season, general area, specific site, kind of food, and feeding strategy all influence the daily pattern of foraging activity among wildfowl. During the winter or when feeding

in rice fields, certain species are predominantly nocturnal. The majority, on the other hand, are crepuscular, feeding in the early morning, from dawn to just after sunrise, and in the hours leading up to dark; moonlight nights sometimes result in an upsurge in activity. Predators have a part in determining a bird's daily activity routine.

BREEDING

Almost all wildfowl species only attempt breeding once a year, during the most favourable season. This is especially true in areas with distinct seasons, when both acceptable habitat and food are more or less predictable. However, in a number of places, the climate is more consistent for the majority of the year, with sporadic bouts of rain. This is the situation in portions of northern and inland Australia, where rainfall and consequent flooding of billabongs initiate the start of breeding activities.Many wildfowl in temperate areas of both hemispheres are essentially migratory, as many of the breeding areas, which are abundant in food and water in the spring and summer, may freeze over during the winter, and the few areas that remain ice-free are insufficient to support the increased populations after the breeding season. Furthermore, in high latitudes, where most birds breed, the period of good weather and plentiful food is usually too short to fit in a full breeding cycle, so some breeding activities, such as pair formation and courtship displays, must be performed while the birds are still in their winter quarters or on their way to their breeding grounds.Water is often the limiting issue for wildfowl breeding in subtropical regions, because warm, dry weather lasts for significantly longer periods of time. Numerous places flood throughout the winter as a result of autumn rains, resulting in a plethora of small temporary lagoons where many breeding pairs establish themselves. However, in such areas, birds are limited to relatively short breeding cycles in order to ensure that the brood has fledged before the area completely dries up, forcing the birds to move off and concentrate in much larger water bodies, sometimes leading to vagrancy and large-scale irruptions, in what has been dubbed the "summer drought exodus."

The larger and more territorial species, like as swans and geese, use the reverse technique, where the pair bond is permanent and perhaps life-long. Swans, particularly Bewick's Swans (Cygnus columbianus bewickii), are an extreme case. One study found that among 500 pairs that had produced young over multiple years, there was not a single case of "divorce," whereas just 1% of 1000 chronically unsuccessful pairs ever changed partner. Similarly, only around 9% of Mute Swans who had successfully bred one year changed partners the following season, and only about 3% of those who had attempted to breed but failed to produce young moved partners.

In contrast to most duck species, where the male plays little or no role in incubation or chick rearing, male birds in species with permanent pair bonds play an active role in breeding tasks, such as sitting on the eggs while the female is out feeding during incubation, guarding her while she incubates, accompanying young, defending the territory necessary to provide enough food for the entire family, and so on. This is the situation with most whistling-duck species, in which the family leaves the breeding waters once the young have fledged and joins bigger flocks. Even inside the flock, it appears that the couple will stick together until the conditions are right to try breeding again.Geese have a similar strategy as ducks. Even though they do not have a year-round area, they remain coupled for life. The male assists with incubation and rearing the brood, and once the young have fledged, the entire family joins big flocks and travels together to winter quarters, where the pair stays together until the next spring. In these species, a high number of juveniles spend the winter with their parents and frequently return to the breeding areas in their company.Young birds do not form a pair bond until their second winter, and yearlings often spend the summer of their second year on their parents' nesting territory, helping to defend it and rear their much younger siblings.

In any given season, almost all wildfowl are monogamous. Males of some species, however, may copulate with unattended females on occasion, notably in species where the female is abandoned soon after incubation begins, and especially in places where the odds of complete nesting failure are highest. In the long run, such promiscuous behaviour adds just a little increase in the chances of the eggs being fertilised properly, while it is unlikely to interfere with overall breeding success; in any event, males often leave to moult at a young age, so only a few are involved.

The nest is usually a simple structure. Very often it consists of only a hollow or shallow scrape in the ground, sparsely lined with vegetation, including herbs, mosses and lichens, but frequently with some feathers. These come from the female's breast, and by plucking them she uncovers her extensive brood patches. These areas of bare skin, abounding in blood vessels, transmit heat more efficiently than any other part of the bird's body and are essential for effective incubation. The habit of lining the nest with down is particularly well developed in species that breed in high latitudes, especially the eiders, which are commonly farmed for this purpose (see Relationship with Man).The insulating properties of the breast down help keep the nest warm and prevent the eggs from being chilled if the female has to leave them for an extended period of time. Furthermore, many species' females cover the eggs with down before they leave, making the

nest inconspicuous and thereby reducing the chance of predation.

Some species may gather vast amounts of plant material and build their nests in the form of large conical mounds, on top of which there is normally a small depression where the eggs are laid, especially in marshy places where flooding is a severe hazard. Swan nests are often found on the ground in reed beds or partially afloat and are typical of swans.

Ducks can lay new clutches if the initial attempt fails during the early stages of incubation, but once past that time, breeding is unlikely to be attempted again in the same season, and it is usually postponed until the following year. Replacement laying often entails smaller clutches of lighter eggs in the situations analysed, therefore the chances of the ensuing chicks surviving are greatly lowered. New eggs are laid after a varied period of 4-20 days or longer, which is mostly dictated by the time since the original clutch's last egg was laid.The longer the time between the last egg being placed and the clutch being lost, the longer it will take and the less likely a replacement clutch will be laid.

Because precocial chicks leave the nest soon after hatching to find food for themselves, it's critical for all of the chicks in a brood to hatch more or less at the same time, within a 24-hour period, so incubation can't begin until the last egg has been laid and the clutch is complete. Incubation lasts 22 days in Common Teal, Garganey (Anas querquedula), Northern Pintail, and Ross's Goose (Anser rossii), and 35 or 40 days in Trumpeter and Black Swans. The Greater White-fronted Goose (Anser albifrons), Snow Goose (Anser caerulescens), and Brent Goose (Branta bernicla) are among the geese that breed in the high Arctic.They are committed to a very short breeding cycle because they have such a short period of suitable weather for nesting, so despite their relatively large size, they have remarkably short incubation periods of less than 25 days in all cases, which are only comparable to those of small ducks in more southern latitudes.

The Black-headed Duck is the only true parasitic breeder in the Anatidae family, laying its eggs in the nests of a variety of marsh birds, including many species of coot (Fulica) and the Rosy-billed Pochard (Netta peposaca). The egg or eggs are incubated alongside those of the host species, and with an estimated incubation period of only 21 days, they hatch ahead of the host. The young chick is quite precocious, leaving the nest barely one or two days after hatching. It can fend for itself from a young age and does not interfere with the rest of the brood, becoming self-sufficient nearly immediately.

Wildfowl chicks begin calling more insistently inside the egg three or four days before hatching than chicks from other groups. It's been proposed that at this stage, communication between the chicks aids all or most of them in hatching within a few hours, because the really weak or exceptionally delayed must be abandoned at the nest, while those who have hatched want sustenance. At the same time when the chicks begin peeping within the egg, the mother at the nest becomes much more alert. At this time, in species where the male defends the female while she incubates, he also goes closer to the nest.Wildfowl chicks begin calling more insistently inside the egg three or four days before hatching than chicks from other groups. It's been proposed that at this stage, communication between the chicks aids all or most of them in hatching within a few hours, because the really weak or exceptionally delayed must be abandoned at the nest, while those who have hatched want sustenance. At the same time when the chicks begin peeping within the egg, the mother at the nest becomes much more alert. At this time, in species where the male defends the female while she incubates, he also goes closer to the nest.

MOVEMENTS

Wildfowl that nest in high latitudes, where they can take advantage of the explosion of life and almost continuous sunlight during the local summer, generally fly to lower latitudes during the non-breeding season, whereas those that nest in tropical or subtropical latitudes stay in the same region all year. This is especially true for most tundra-breeding species, because the spring thaw generates extensive expanses of unbroken wetlands, such as bogs, swamps, and fens, where a significant number of birds may breed, but the same area is covered in snow and ice for several months throughout the winter.

Some wildfowl species carry out extremely exact migrations, with pre-determined routes and target areas, as well as regular timing and stopping points. Others are more erratic, not moving until displaced by bad weather, and then only as far as the first acceptable region. Geese are good instances of the former, while sawbills are good examples of the latter. Individuals or populations in many species, however, are more migratory than others. In many situations, there are significant disparities in the breadth of migratory movements between the sexes, and, as with most groups of birds, juvenile birds spread more widely than adults.

The majority of tropical and subtropical wildfowl spend their off-season months near the water body where they breed. The biggest issue they have to deal with is the wide range of water levels in swamps and lakes. Wildfowl breeding populations in wetlands that are likely to dry up must alter their cycles, and once they have bred, they must migrate on to more appropriate locations as soon as the water level begins to decline. These movements, known as "drought migrations," may

entail large groups of birds flying long distances, especially when one of the temporary refuges dries out, forcing the birds to fly off in search of another suitable wetland.

CONSERVATION AND STATUS

Although five wildfowl species and three subspecies are thought to have gone extinct in modern times, and 16 extant species are currently considered threatened on a worldwide scale, the Anatidae family's overall status is far better than that of many other large bird families. Given the high levels of exploitation that wildfowl have historically faced, this is very encouraging, since it suggests that successful preservation could be done with less complicated techniques than are required for many other birds. Many species have robust populations in the millions and can be found in a variety of locations across the globe.

The Labrador Duck was almost certainly never in great abundance. Its unusual bill suggests that it ate a highly specialised diet, maybe consisting of mollusks, which it could have gotten by dabbling or diving like other sea ducks. The bird was shot and widely sold in markets, but the limited numbers involved are not likely to have been sufficient to bring the species to extinction. The causes why this may be studied at the bird's undiscovered nesting grounds, which could have been on a few islands and could have been overrun by a mammalian predator or visited on a regular basis by bird fowlers or egg-collectors.The last time the Auckland Merganser was seen was in 1902. It was previously common throughout New Zealand, according to fossil evidence, and it may have populated the South Island. It was a specialised fish eater that lived in brackish water and huge streams. It may have succumbed to some shooting, but its final demise was probably certainly brought about by predation by foreign species introduced to the main Auckland Island, such as pigs, cats, and rats.

A tiny population may have survived on adjacent Adams Island, which is predator-free, although the habitat is generally unsuitable, and despite repeated searches particularly for the species, there are no recent indicators of the species thriving there.

It's almost certain that the Pink-headed Duck is extinct. The last confirmed sighting of the bird in the wild occurred in 1935, while there have been some unconvincing reports that it may still exist in isolated areas of northern Burma, India, and Tibet. Only a few were kept in captivity in England, France, and possibly Calcutta, but they never managed to reproduce, and the last one died in 1944 in France. The species is reported to have never been numerous, and the final causes of its extinction were most likely habitat degradation and overhunting, from which the population never recovered.

Every summer, a large number of ducks, geese, and swans become infected and die. The disease is being fought in some areas where it has previously been found, but it appears that only early detection can effectively prevent large-scale mortality; management recommendations include avoiding summer water level fluctuations and disposing of vertebrate carcasses quickly and properly. The similar level of wildfowl mortality is currently occurring in the United States owing to avian cholera, a bacterial disease. Pasteurella multocida causes this extremely infectious and possibly lethal disease, which in its most severe form can kill in just a few hours.

Despite all of these negative circumstances, wildfowl have a bright future as long as their habitats are protected and restored, where possible. Wetland drainage at its current rate is the world's greatest serious threat to their survival. The destruction of coastal lagoons to improve the attractiveness of a place for tourists, and the exploitation of lakes and rivers for recreational reasons are all causes that reduce the richness and diversity of wildfowl, therefore protection of all relevant habitats around the world is critical.

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