

Ornithologists often use a calendar-based system to categorize bird age. While this system works in northern hemispheres, it is less practical in tropical and southern hemispheres where species often breed across 1 January. Wolfe et al. (2010) recently proposed an age classification system based on molt and plumage cycles. The 'cycle-based ageing system' is comprised of three alphanumeric codes. The first code refers to the molt cycle (if you do not know or understand the definition of 'molt cycle' please read the accompanying definitions). The second code indicates if the bird is molting or not, or if the bird can be aged 'after' a given plumage (e.g. the bird is at least 'after juvenile plumage'). Finally, the third code denotes the plumage of the bird (e.g. alternate, basic, juvenile, etc.). The cycle-based system can accurately categorize the age of any bird irrespective of latitude, calendar-date or life history. Below is a complete list of cycle-based codes and examples.

TABLE 1. Complete list of codes used in the cycle-based system

1st Position	1st Position Definition	2nd Position	2nd Position Definition	3rd Position	3rd Position Definition
U	Unknown Molt Cycle	C	Not Molting ('C' for <i>cycle</i>)	U	Unknown Plumage
D	Definitive Molt Cycle	P	Molting ('P' for <i>pre</i>)	J	Juvenile Plumage
F	First Molt Cycle	A	After a Given Plumage	S	Supplemental Plumage
S	Second Molt Cycle			F	Formative Plumage
T	Third Molt Cycle			B	Basic Plumage
4	Fourth Molt Cycle			A	Alternate Plumage

TABLE 2. Examples of the most commonly used codes

Cycle Code	Definition	Explanation
UCU	Unknown Cycle Unknown	Molt cycle and plumage of the bird is completely unknown
FCU	First Cycle Unknown	Within the first molt cycle, but plumage is unknown. This code is commonly used for birds with incomplete skulls with ambiguous formative and juvenile plumage (e.g. many Woodcreepers)
UCB	Unknown Cycle Basic	Molt cycle unknown, but plumage can be positively identified as basic. This code can also be expanded to UCA - Unknown Cycle Alternate
FCJ	First Cycle Juvenile	Juvenile/1st basic plumage - juvenile plumage only occurs within the first molt cycle
FPF	First Preformative Molt	Molting from juvenile plumage into formative plumage which only occurs in the first molt cycle
FCF	First Cycle Formative	Formative plumage - formative plumage only occurs within the first molt cycle
FPA	First Prealternate Molt	Molting from formative plumage into first alternate plumage
FCA	First Cycle Alternate	Alternate plumage within the first molt cycle.
SPB	Second Prebasic Molt	Molting from formative or first-alternate plumage into 2nd basic plumage
DPB	Definitive Prebasic Molt	Molting into definitive basic plumage
DCB	Definitive Cycle Basic	Definitive basic plumage
DPA	Definitive Prealternate Molt	Molting into definitive alternate plumage
DCA	Definitive Cycle Alternate	Definitive alternate plumage
FAJ	After Juvenile Plumage	Birds can not be aged more precisely than after juvenile plumage. This code is commonly used with species that have complete preformative molts (indistinguishable from definitive basic plumage, e.g. many woodcreepers and furnarids).
SAB	After Second Basic Plumage	Has atleast surpassed the second basic plumage - the 'A' for after codes is commonly used for birds that have incomplete prebasic molts such as woodpeckers, seabirds and raptors. This code can be expanded to TAB, 4AB, 5AB, etc.

As a general rule, all passerines undergo an annual complete to nearly complete molt called the prebasic molt. The first prebasic molt occurs in the nest and is more commonly referred to as the prejuvenile molt. Thus, the prejuvenile and first prebasic molts are synonymous. We recommend using 'prejuvenile' instead of 'first prebasic' due to its wide established usage. Shortly after the completion of the prejuvenile molt all passerines go through a preformative molt which is unique in that it only occurs only once in the life of a bird (immediately following the prejuvenile molt) and is often incomplete or partial. Because the preformative molt is often partial or incomplete, there are usually two generations of feathers among flight feather coverts; the presence of these two generations of feathers, formative and juvenile, are called molt limits. Many migratory species undergo another partial to incomplete molt, called the prealternate molt, after the preformative molt prior to a bird's first breeding season. Finally, after a bird's first breeding season (at about 1 year of age) birds will undergo a complete molt called the second prebasic molt. The complete nature of the second prebasic molt typically results in a definitive plumage indistinguishable from subsequent basic plumages and is, therefore, referred to as 'definitive.' Prebasic molts are used to define molt cycles, which are often approximately twelve months in length. For example, from the initiation of the prejuvenile molt (e.g. first prebasic molt) until the initiation of the second prebasic molt is referred to as the 1st molt cycle; similarly, from the initiation of the second prebasic molt until the initiation of the third prebasic molt (approximately twelve months between the two prebasic molts) is known as the second molt cycle, and so on. Most resident tropical passerines will continue to undergo definitive prebasic molts following breeding for the duration of their life. In contrast, most migratory passerines will continue to undergo definitive prealternate molts prior to the breeding season and definitive prebasic molts following breeding for the duration of their life.

Essential Terminology

Molt: a cyclical and often annual process of feather replacement.

Adventitious replacement: replacement of accidentally lost or damaged feathers; adventitious replacement is neither cyclical nor annual and should therefore not be considered molt.

Flight feathers: wing (remiges) and tail feathers (retrices).

Complete molt: replacement of all feathers.

Partial molt: replacement of body feathers, some wing coverts, possibly some to all tertials and maybe the central retrices and no other flight feathers.

Incomplete molt: similar to partial molt but also includes some but not all of the flight feathers.

Definitive: mature molt or plumage indistinguishable from subsequent homologous molts or plumages.

Pre: indicating active molt. For example, the *prejuvenile* molt results in the juvenile plumage.

Prebasic molt: the molt by which most birds replace all of their feathers, usually occurring annually. The first prebasic molt is synonymous with the prejuvenile molt, occurring within the nest. Subsequent prebasic molts are typically definitive, occurring after the breeding season.

Prebasic molt initiation: shedding of the first primary (p1).

Molt cycle: approximately twelve months in length from the initiation of a prebasic molt until the initiation of the subsequent prebasic molt. For example, from the initiation of the prejuvenile molt (e.g. first prebasic molt) until the initiation of the second prebasic molt is referred to as the 1st molt cycle; similarly, from the initiation of the second prebasic molt until the initiation of the third prebasic molt is known as the second molt cycle, and so on.

Preformative molt: unique molt only occurring during the first molt cycle, after the prejuvenile molt.

Prealternate molt: partial or incomplete molt commonly occurring prior to the breeding season in migratory species.

Molt limit: the location within or between feather tracts where feathers of different generations (most often juvenile and formative) appear side by side.