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A LIST OF BIRDS WITH KNOWN FEATHER COLOURANT SYSTEMS

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A review of the accessible literature has enabled the compilation of the following extensive (though probably incomplete) list of birds for which the feather colourant system has been described. The birds are grouped according to feather colour, which in most cases refer to specific areas of the plumage rather than the overall colour of the bird. It is likely that the colours referred to apply primarily to male birds.

Two major systems are responsible for feather colouration, structural effects and pigments. Structural effects are those which cause interference of light (iridescence) or scattering of light (Tyndall scattering). The pigments found in feathers fall into a limited range of chemical classes; carotenoids, porphyrins and melanins. For a full explanation of animal colourant systems consult Fox and Vevers (1960) or Fox (1976).

Tyndall scattering, which causes blue colouration, frequently occurs in combination with other colouring methods. In the list, Tyndall colours have been used to describe in shorthand such combinations, and are defined as follows:-

Tyndall Blue:	Tyndall Scattering	alone
Tyndall Purple:	"	combined with a red pigment 'filter'
Tyndall Green :	"	" " a yellow " "
Tyndall Brown :	"	" " a melanin "
Tyndall Grey :	"	modified by powder on feather surface

Whereas Tyndall colours are caused by the superimposition of different colourant systems, apposition colours result from the close proximity within the feather of different colours. For example, melanin in the barbule and yellow pigment in the barb gives an olive-green appearance to the feather.

In the cases where pigments are solely responsible for the colouration of feathers, only those examples where the nature of the pigments is known are included in this list.

Each scientific name is followed by the appropriate reference number(s). Scientific and vernacular names follow Walters (1981).

<u>Colourant System</u>	<u>Scientific Name</u>	<u>Vernacular Name</u>
PURPLE		
Tyndall Purple	<u>Nyctiornis amicta</u> [1]	Red-Breasted Bee-Eater
" "	<u>Chlamydera</u> spp. [1]	Bowerbirds
" "	<u>Paradisaea decora</u> [1]	Goldie's Bird of Paradise
Apposition (see footnote i)	<u>Psittacula cyanocephala</u> [1,18,21]	Plum-Headed Parakeet
Carotenoid	<u>Poephila gouldiae</u> [7,14]	Gouldian Finch
"	<u>Eurylaimus</u> spp. [1]	Broadbills
"	<u>Cotinga</u> spp. [1]	Cotingas
BLUE		
Tyndall Blue	<u>Colius macrourus</u> [1]	Blue-Naped Mousebird
" "	<u>Paridae</u> [1]	Tits (Blue Tit)
	(e.g. <u>Parus caeruleus</u> )	

<u>Colourant System</u>	<u>Scientific Name</u>	<u>Vernacular Name</u>
BLUE (cont.)		
Tyndall Blue (cont.)	<u>Paradisaea rudolphi</u> [1]	Blue Bird of Paradise
" "	<u>Pteridophora alberti</u> [1]	King of Saxony Bird of Paradise
" "	<u>Coracina azurea</u> [1]	Blue Cuckoo-Shrike
" "	<u>Garrulus glandarius</u> [1]	Common Jay
" "	<u>Corythaeola cristata</u> [1]	Great Blue Turaco
" "	<u>Hypothymis</u> spp. [1]	Blue Monarchs
" "	<u>Coua caerulea</u> [1]	Blue Coua
" "	<u>Alcedo atthis</u> [18]	Common or Little Blue Kingfisher
" "	<u>Melopsittacus undulatus</u> [18]	Budgerigar
" "	<u>Cyanocitta cristata</u> [22]	Blue Jay
" "	<u>Irena puella</u> [22]	Fairy Blue Bird
" "	<u>Passerina cyanea</u> [22]	Indigo Bunting
" "	<u>Trichoglossus</u> spp. [22]	Lorikeets
" "	<u>Pitta</u> spp. [22]	Pittas
" "	<u>Poospiza thoracica</u> [22]	Bay-chested Warbling Finch
" "	<u>Passerina ciris</u> [22]	Painted Bunting
" "	<u>Sialia</u> spp. [22]	Bluebirds

#### GREEN

Tyndall Green	<u>Ptilinopus</u> spp. [1]	Doves or Fruit Pigeons
" "	<u>Picus</u> spp. [1]. (e.g. <u>P. viridis</u> )	Woodpeckers (Green Woodpecker)
" "	<u>Cochoa viridis</u> [1]	Green Cochoa
" "	<u>Malaconotus</u> spp. [1] (e.g. <u>M. gladiator</u> )	Shrikes (Green-breasted shrike)
" "	<u>Coraciidae</u> [1]	Rollers
" "	<u>Momotidae</u> [1]	Motmots
" "	<u>Cissa chinensis</u> [21]	Green Magpie
" "	<u>Ara ararauna</u> [22]	Blue and Yellow Macaw
" "	<u>Poospiza thoracica</u> [22]	Bay-chested Warbling-Finch
Porphyrin	<u>Tauraco</u> spp. (except <u>T. leucolophus</u> ) [14,23]	Turacos
" "	<u>Musophaga</u> spp. [14,23]	Turacos
Carotenoid	<u>Somateria</u> spp. [1]	Eiders
" "	<u>Nettapus</u> spp. [1]	Pygmy Geese
" "	<u>Rollulus rouloul</u> [1]	Roulroul Partridge - female only

#### OLIVE-GREEN

Apposition (see footnote ii)	<u>Aegithina tiphia</u> [1] <u>Carduelis chloris</u> [21]	Common Iora Greenfinch
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#### YELLOW-GREEN

Apposition (see footnote iii)	<u>Treron</u> spp. [1] <u>Zosteropidae</u> [1]	Green Pigeons White Eyes
Carotenoid	<u>Chlorospingus pileatus</u> [20]	Sooty-Capped Bush Tanager

<u>Colourant System</u>	<u>Scientific Name</u>	<u>Vernacular Name</u>
YELLOW		
Carotenoid	<u>Serinus canaria</u> [15]	Canary
"	<u>Colaptes auratus</u> [15]	Common Flicker
"	<u>Poephila gouldiae</u> [7,14]	Gouldian Finch
Phaeomelanin	<u>Gallus gallus</u> [21]	Domestic Fowl - chicken down
SCARLET YELLOW		
Carotenoid	<u>Ramphocelus</u> spp. [4,15]	Tanagers
ORANGE-RED		
Carotenoid	<u>Rupicola peruviana</u> [18]	Peruvian cock-of-the-rock
RED		
Porphyrin	Musophagidae [21,23,26]	Turacos
Carotenoid	<u>Bombycilla cedrorum</u> [6,15]	Cedar Waxwing
"	<u>Ptilinopus</u> spp. [21]	Doves or Fruit Pigeons
"	<u>Poephila gouldiae</u> [7,14]	Gouldian Finch
SCARLET RED		
Carotenoid	<u>Piranga ludoviciana</u> [4]	Western Tanager
"	<u>Piranga flava</u> [4]	Hepatic Tanager
"	<u>Piranga olivacea</u> [3]	Scarlet Tanager
"	<u>Endocimus ruber</u> [11,14,15]	Scarlet Ibis
PINK		
Carotenoid	<u>Phoenicopterus roseus</u> [13,14,15,17]	Rosy or Greater Flamingo
"	<u>Phoenicopterus chilensis</u> [13,14,15,17]	Chilean Flamingo
"	<u>Phoenicopterus ruber</u> [13,14,15,16]	Rosy or Scarlet Flamingo
"	<u>Phoenicoparrus andinus</u> [13,14,15,16]	Andean Flamingo
"	<u>Phoenicoparrus jamesi</u> [13,14,15,16]	James' Flamingo
"	<u>Phoeniconaias minor</u> [13,14,15,17]	Lesser Flamingo
ROSE PINK		
Carotenoid	<u>Ajaia ajaja</u> [12,14,15]	Roseate Spoonbill
PINKISH BROWN		
Apposition (see footnote iv)	<u>Fringilla coelebs</u> [18]	Chaffinch - male only

<u>Colourant System</u>	<u>Scientific Name</u>	<u>Vernacular Name</u>
BROWN		
Porphyrin	<u>Strix</u> spp. [5]	Owls
"	<u>Lophotis</u> spp. [5]	Bustards
Tyndall Brown	<u>Psitttrichas fulgidus</u> [9]	Pesquet's Parrot
" "	<u>Merops apiaster</u> [1]	European Bee-eater

FAWN GREY

Apposition (see footnote v)	<u>Parus palustris</u> [18]	Marsh Tit
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GREY

Tyndall Grey	Columbidae [21] (e.g. <u>Columba livia</u> )	Pigeons (Feral Pigeon)
" "	Gruidae [21] (e.g. <u>Grus grus</u> )	Cranes (Grey Crane)
Apposition (see footnote vi)	<u>Coracina</u> spp. [1] (e.g. <u>C. polioptera</u> )	Cuckoo-Shrikes (Lesser Cuckoo-Shrike)
" "	<u>Parula</u> spp. [1]	Parulas
" "	<u>Melopsittacus undulatus</u> [18]	Budgerigar

BLACK OR DARK BROWN

Eumelanin	<u>Corvus</u> spp. [21] (e.g. <u>Corvus corone</u> )	Crows (Carrion Crow)
"	<u>Turdus merula</u> [21]	Blackbird

BLACK

Eumelanin	<u>Musophaga</u> spp. [23]	Turacos
"	<u>Poephila gouldiae</u> [7]	Gouldian Finch

Colourant System : Iridescence (Various Colours)

<u>Scientific Name</u>	<u>Vernacular Name</u>
Meliphagidae [1]	Honey-eaters
<u>Paradisaea decora</u> [1,24]	Goldie's Bird of Paradise
Nectariniidae [1]	Sunbirds
<u>Plegadis</u> spp. [1]	Ibises
Trogonidae [1,8]	Trogons
<u>Hagedashia hagedash</u> [1]	Hadada
<u>Lamprotornis</u> spp. [1]	Glossy Starlings
<u>Theristicus caudatus</u> [1]	White-throated Ibis
<u>Upupa epops</u> [1]	Hoopoe
Trochilidae [1,19]	Humming Birds
<u>Chrysococcyx</u> spp. [1]	Cuckoos
<u>Hirundo rustica</u> [1]	Swallow
Psophiidae [1]	Trumpeters
Phalacrocoracidae [1]	Cormorants

Colourant System: Iridescence (cont.)

<u>Scientific Name</u>	<u>Vernacular Name</u>
<u>Philomachus pugnax</u> [1]	Ruff
<u>Cissopsis leveriana</u> [1]	Magpie-Tanager
<u>Rhinoptilus</u> spp. [1]	Courser
<u>Ptilorhynchus violaceus</u> [1]	Satin Bowerbird
<u>Probosciger alterrimus</u> [1]	Palm Cockatoo
<u>Phasianus versicolor</u> [1]	Green Pheasant
<u>Phasianus colchicus</u> [1]	Ring-necked Pheasant
<u>Teripsiphone</u> spp. [1]	Paradise Flycatchers
<u>Vanellus vanellus</u> [1]	Common Lapwing
<u>Dicaeum</u> spp. [1]	Flower-peckers
<u>Chloroceryle</u> spp. [1]	N. and S. American Kingfishers
Icteridae [1]	Icterids, American Orioles, Cowbirds
<u>Parus melanolophus</u> [1]	(Vigor's) Black-crested Tit
<u>Pitta</u> spp. [1]	Pittas
<u>Coa caerulea</u> [1]	Blue Coa
<u>Lophophorus</u> spp. [22]	Monal Pheasants
<u>Aix sponsa</u> [22]	Wood Duck
<u>Cairina moschata</u> [22]	Muscovy Duck
<u>Columba livia</u> [22]	Feral Pigeon
<u>Pavo cristatus</u> [22]	Indian Peafowl (Peacock only)
<u>Phaps chalcoptera</u> [22]	Bronze-winged Pigeon
<u>Ptilinopus pulchellus</u> [22]	Crimson-capped Dove
<u>Ptilinopus magnificus</u> [22]	Magnificent Dove
<u>Paradisaea rubra</u> [22,24]	Red (King) Bird of Paradise
<u>Polyplectron bicalcaratum</u> [22]	Grey Peacock Pheasant
<u>Butorides virescens</u> [22]	Green Heron
<u>Anas platyrhynchos</u> [22]	Mallard (Drake only)
<u>Chrysolophus pictus</u> [22]	Golden Pheasant
<u>Melagris gallopavo</u> [22]	Common Turkey
<u>Sturnus vulgaris</u> [22]	Common Starling
Galbulidae [22]	Jacamars

Colourant System : Iridescence superimposing Tyndall colour

<u>Pitta</u> spp.[1]	Pittas ('Mother of Pearl' iridescence)
<u>Pipra</u> spp.(e.g. <u>P.iris</u> )[1]	Manakins(Opal Manakin)('M of P'irid.)
<u>Tanagra seledon</u> [1]	Celadon or Green-headed Tanager ( 'Gold Texture' iridescence)

Colourant System : Iron Oxide on Feathers (Red, Brown)

<u>Pelecanus onocrotalus</u> [2,10]	Great White Pelican
<u>Gypaetus barbatus</u> [2]	Lamergeier or Bearded Vulture

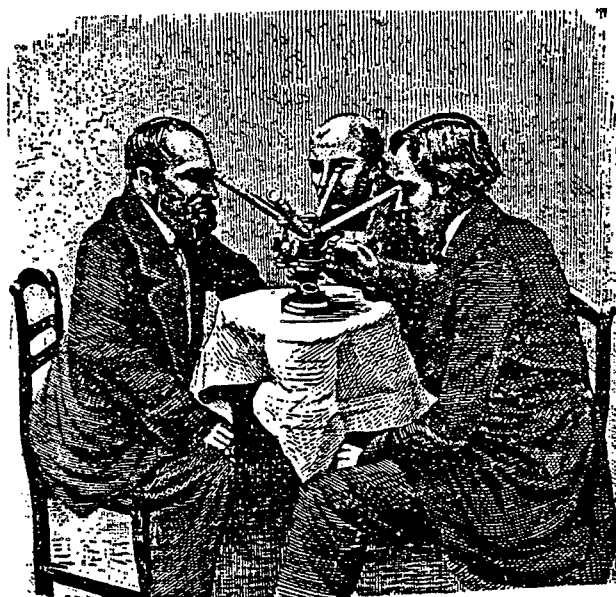
Footnote

- (i) Tyndall Blue barbs and carotenoid-red barbules.
- (ii) Eumelanin (black) in barbule tips and yellow pigment in barbs and bases of barbules.
- (iii) Probably Tyndall Blue in barbules and yellow pigment in barbs.
- (iv) Pheomelanin (light brown?) pigmented areas of feather close to unpigmented (white) areas.
- (v) Pheomelanin (yellow?) in barbs and eumelanin (black) in barbules.
- (vi) Eumelanin (black) pigmented areas of feather in close proximity to unpigmented (white) areas.

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