

A descriptive ethogram for the behaviour of Black Robin *Saxicoloides fulicatus leucopterus* (Linnaeus, 1766) in a semi developed, intermediate zone habitat of Sri Lanka

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Abstract

Ad-libitum and focal-animal behaviour sampling was used to construct an ethogram for the behaviour of Black Robin in the wild. The study recorded 53 behavioural events, in 12 acts under five types of behaviour (6 acts, 29 events of self-maintenance behaviour; 2 acts, 10 events of locomotion behaviour; 2 acts, 6 events of reproductive behaviour; 1 act, 3 events of agonistic behaviour; and 5 events of the territorial display). The behavioural acts described here include foraging, elimination, shelter-seeking, resting, cleaning, vocal communication, terrestrial and aerial locomotion, defence, territorial display, pair bonding, nest building, nidification, and the agonistic act. The peculiar territorial display of the species is recorded here, in detail, for the first time. Courtship and mating acts could not be recorded during the study period spanned outside the peak of their breeding season.

Introduction

The Indian robin *Saxicoloides fulicatus* (Linnaeus, 1766) (Passeriformes: Muscicapidae) is distributed throughout the Indian sub-continent, while the race *S.f.leucopterus* (Black Robin) is endemic to Sri Lanka. It is a sparrow-sized bird, with fuller plumage than a sparrow. The male is glossy blue-black, with white lesser wing coverts and chestnut under tail coverts. The female is dark greyish brown, with chestnut under tail coverts, and no white in the wing. It is a common bird throughout the island, especially in the dry and intermediate zones. It prefers open scrubland or gardens, rocky areas, newly burnt clearings, cultivated chenas and eschews heavy forest. (Legge, 1980; Grimmett *et al.*, 1998; Henry 1998;). It inhabits semi-developed, agricultural or sub-urban areas often in close proximity to human habitations. Therefore, studying Black Robins and understanding their behaviour could help to manage human habitations in a manner that the birds and humans can live together. Regrettably, there is little literature available on the behaviour of this species apart from

descriptions in general field guides. Henry (1998, p. 381) describes its behaviour stating "this merry little bird spends most of its time on the ground where it runs actively, searching for small insects". According to Legge (1980, p. 568) "It is most animated in its movements, carrying its tail erect and jerking it up with a corresponding strutting down of its wings when giving out its pretty warble, and moving hither and thither with a short jerky flight and it consorts in pairs".

This paper presents an ethogram for the behaviour of Black Robin in the wild. It attempts to standardize the classification of Black Robin's behaviour, while describing them in detail. Nevertheless, we were unable to observe the full behavioural repertoire of the bird as few acts such as courting and mating were not recorded since the study was conducted outside the peak breeding season.

Study Area

The study was conducted in the Buttala Campus premises (Faculty of Applied Sciences) of the Sabaragamuwa University of Sri Lanka. It is about 1.5 Km towards Monaragala from the Buttala junction along the Colombo-Batticaloa main road (A4) in the Monaragala district of Sri Lanka. It is situated in a valley between two mountain ridges, Rahathangala and Andampahuwa, within the Intermediate Lowlands bioregion of Sri Lanka (Ministry of Forestry and Environment, 1999) and the floristic region of the Eastern Intermediate Lowlands (Ashton and Gunatilleke, 1987). The study area includes a semi developed habitat including well wooded human habitations, managed grasslands, dry/uva-patana grasslands, secondary scrub/woodlands, forest plantations of Teak (*Tectona grandis*) and few patches of moist semi evergreen forests.

Methodology

Field observations were made during a period of 57 days between 06:30 and 18:30hrs from July to October 2000. Some nocturnal observations were also carried out to supplement above data. A pair of 7 X 35 Binoculars were used for the observations. Data was collected predominantly during the dry season.

Ad-libitum behaviour sampling as described by Altman, (1974) was conducted throughout the research period in order to construct the ethogram. All possible details of the black robin's behaviour were noted with the time, weather conditions and habitat features being recorded. Rough sketches and photographs of the bird's behaviour supported these observations. The focal animal sampling method was also used for auxiliary support of the data.

Behavioural events are labelled and described in terms of form and context, and our focus was

not to assign any meaning or motivation to them (see Seddon, 1991). Behavioural events of the Black Robin were classified dependent on the observer perceptions of the animal's attitudes, and few previously published references (cited where relevant). Some events may fall into more than one category.

Results and Discussion

Ethogram

The following ethogram was constructed for the Black Robin including 53 different behavioural events in 12 acts under five major types of behaviour (8 acts of self-maintenance behaviour – with 29 events, 2 acts of locomotion behaviour – with 10 events, 2 acts of reproductive behaviour – with 6 events, agonistic behaviour – with 3 events and the territorial display – with 5 events,).

Table 01. Ethogram for behavioural activities of black robin (*Saxicoloides fulicatus leucopterus*) in the wild

Type of Behaviour	Behavioural act	Behavioural event
Self-maintenance Behaviour	Foraging	Picking, Darting, Pouncing, Gleaning, Holding and picking, Killing and feeding, Playing with food, Searching Turning leavesover, Drinking
	Elimination	Defecation
	Shelter-seeking & resting	Standing posture, Hiding Sitting posture, Roosting posture, Perching Panting
	Cleaning	Bill cleaning, Preening Direct scratching Wing stretching, Puffing Plumage, Bathing Sunbathing
	Vocal Communication	Song (when look-out / at perch / territorial) Alarm Call
	Defence	Attacking, Withdrawal Investigating

Type of Behaviour	Behavioural act	Behavioural event
Locomotion behaviour	Locomotion on land	Hopping, Running Stand-alert posture Look-out posture Tail-jerking, Jumping,
	Arial Locomotion	Flight, Short flight, Flying up Gliding down
Reproductive (sexual) behaviour	Pair bonding	Touching beaks
	Courtship	Not recorded during the study period.
	Mating	
	Nest building & nidification	Nest building, Incubating eggs Nest guarding, Nest cleaning Feeding the brood/fledgling
Agonistic behaviour	Agonistic act	Chasing on ground Chasing in flight, Fighting
Territorial behaviour	Territorial display	Charging each other Elevating & lowering stretched neck Showing off, Erecting tail & bill Supplanting attack

Description of behaviour patterns

Self-maintenance Patterns

Foraging

Ten foraging events were documented. These included feeding, searching food and drinking water. **Picking** is the most commonly used method of feeding, from substrates such as soil, grass (dead or fresh), grassroots, leaves, litter, tree-bark and especially from termite mounds. Robins were observed to pick repeatedly without elevating their heads, when a preferred food item was found in quantity. **Darting** involve chasing and catching fast-moving insect prey on land, while **pouncing** involves the same, when the bird can see its prey below its perch. **Gleaning** is plucking on insects that are resting on leaf surfaces (see Williamson 1971), especially on grass leaves, in the case of

black robins. Grass leaves are placed between its beak and dragged along. **Holding and picking** is seen when a food item is large or when it is attached to a stick or non-movable object, where the bird holds the food down with its feet and perform picking. Though it is not a common behaviour, black robins were recorded **killing and feeding** on worms, caterpillars and few larger insects. The prey is caught from the soil, grass or vegetation and brought on to a rock outcrop, where it is killed by rubbing and banging it against the rock, using the beak as a tool. Only some of the prey is eaten and the rest abandoned. Robins were also observed **playing with prey** before killing it, where they throw the prey up, while jumping at the same time.

Black robins **search** for food with neck outstretched. Sometimes the neck and head are tilted in order to

search the spaces between grasses, stones and other debris on the ground. **Turning leavesover** is a method observed of searching for insects under leaf litter.

Black Robins were seldom observed to drink water, even in the dry season. When it does drink, it lowers its beak in to the water and tilts its head upwards in order to swallow the water. This pattern is repeated several times.

The food preferences of Black Robins include termites and smaller insects, where they were observed to feed on swarming termites, grasshoppers and ants. They pick termites from the fresh parts of termite mounds or, through holes made on the wall of the mound, allowing the termites to come out. This was also recorded as a communal feeding strategy i.e. several robins living in the same territory feed on a fresh termite mound together. A female black robin, together with three juveniles was once observed to feed at a termite mound for more than 10 minutes. Hopping, running, tail-jerking and stand-alert posture are associated with feeding behaviour. When they are replete after capturing several insects or as a response to alarm calls, black robins fly to a perch on which they settle, resulting in an intermittent pattern of feeding, flying, resting and cleaning. Verbeek (1972) describes this sequence in other passerine species, which feed in grasslands. Black robins prefer to feed in grasslands and other open habitats, where they share the habitat and partially feed on the same foods as do red-vented bulbuls (*Pycnonotu scafer*), Rufous-winged bush-larks (*Mirafra affinis*), Common Mynahs (*Acridotheres tristis*) and several other species.

Elimination

Defecation - The black robin defecates with an upward tail jerk, while standing on the ground, or while perching on tree branches and even while

flying. The droppings are rather watery with blackish green centres and white surroundings.

Shelter-seeking & resting

Standing posture: The standing posture can be described as standing on both legs in the same position for observed periods up to 7 minutes (47.32 ± 36.74 seconds, $n=123$). They do so with body upright, usually under shade. This was recorded in-between active foraging sessions.

Hiding: i.e. standing under/behind shelter (often a man-made structure), to escape from extreme weather conditions, during the hot sunny midday hours, and during rain.

Sitting posture: Black Robins were observed to sit at heights of 3 to 6 feet above the ground (on tree branches, roofs, edges of walls and other niches inside buildings and sometimes on rock outcrops). In sitting posture the robin bends its legs and places the ventral surface against the object it is sitting on. Sitting was rarely recorded on bare ground. A juvenile robin was once observed sitting on an open grassland in shade.

Roosting posture: Black Robins settle at small but stable niches for roosting and become inactive. The head is folded onto the body in a comfortable position, turned sideways or hidden within the plumage while sleeping. Roosting places of Black Robin are unusual and often associated with man-made structures. They favour corners of buildings, edges of walls and house interiors for roosting. It was also noted that, they are awakened at the slightest disturbance.

Perching: This can be considered the primary resting behaviour of the Black Robin, and has been observed to last for up to c. 10 minutes (116.59 ± 79.43 seconds, $n = 88$). When perching in warm weather black robins often seek shade and fall silent; and breast feathers are puffed out. Singing while perching was seen in both males and females. Although this has territorial significance, singing on a perch was observed at the territory boundaries as well as inside the territory. Black Robins were recorded to perch at heights ranging from 1 to 20 feet, but rarely exceed 12 feet (6.47 ± 2.99 ft, $n = 88$).

Panting: is characterised by breathing with an open beak while perching (Seddon, 1991). Panting Black Robins were recorded in very hot midday periods and they were observed closing their eyes frequently.

Frequently used perch trees of black robins in ButtalawereNeem (*Azadirachta indica*), Ipil-ipil (*Leucaenaleucocephala*), Guava (*Psidiumguajava*) and it showed a marked preference for *Bougainvillea* (*Bougainvillea* spp.) bushes. It was also observed that cleaning behaviour is usually associated with perching. Perching has a territorial significance; especially for males who use specific perching positions along their territory boundaries. Perching in pairs plays a role in pair bonding of Black Robins.

Cleaning

Bill Cleaning: is performed once a robin perches on a tree branch, after a feeding session. It rubs its beak against the tree branch or even on a rock outcrop. **Preening** is characterised by moving the closed beak through the feathers. When preening its inner wing, the wing is stretched upwards and approached from underneath. The rump and back are preened by bending the neck backwards and approaching from above with a dropped wing. The outer surface of the wing is preened by bending the neck sideways without any movement of the wing (Delius, 1969). The breast and the abdomen are cleaned by bending the neck downwards. Preening is usually associated with body shaking and occurs on a perch during rest periods. Allopreening; i.e. when a bird preens the plumage of another bird (Cullen, 1963), was not recorded in black robins. **Direct scratching**, with one foot over the wing is performed in order to clean the head and upper throat. The bird usually closes its eyes while scratching. Indirect scratching as described by Pearson (1994), where the (scratching) foot is lifted beneath the stretched wing, was not observed in black robins. **Wing stretching**; i.e. alternatively stretching out and folding wings, one at a time (Burkley, 1968),

was recorded at intervals during resting and preening. Puffing plumage (perching while puffing feathers out, especially the breast feathers) was observed in between cleaning sessions and frequently when resting after preening.

Bathing is an uncommon activity. Black Robins were observed to use water accumulated in man-made structures, such as gutters, for bathing purposes. They bathe by immersing their bodies in the water. It is associated with preening events and subsequent body shaking. Black Robins were also recorded bathing in the rain, by exposing themselves to the rain with puffed plumage.

Sun bathing was observed only twice during the study, when the birds lay on sun-heated sand under direct sunlight, stretching their wings with puffed plumage, their abdomens touching the sand. The birds were observed to clear the ground with feet and wings, before lying down. This did not last for long (50 ± 7.07 seconds, $n = 2$). Many birds deliberately expose themselves to direct sunlight to accumulate heat for thermoregulation (Kennedy 1969). According to Brook and Birkhead (1991) sunbathing is directly associated with feather care, as heat is important in restoring and maintaining the flight feathers. Warm sun helps to spread preening oils and also helps to remove flies and mites.

Vocal communication

Communication is the process where the behaviour of one animal alters the probability of some behaviour in another. Information is passed between animals by signalling (Catchpole, 1979). In addition to visual signals like displays, Black Robins perform two basic vocal signals. The **song** of the Black Robin consists of continuously repeated notes, which sound like 'qui wee', 'qui kew wee' or 'qui kewkewveeva'. Henry (1998) described its song as "cheery wee". Black Robins sing when they are in look-out posture (see below), while in movement or at a perch, and the song has a territorial significance too (see the section on territorial behaviour). **Alarm calls** are defined as those calls, which function to alert others to the presence of potential danger, such as the presence of predators (Buckley, 1968; Moynihan, 1955). Black robins give brief and aggressive alarm calls sounds like 'Krrrrrk' or 'Krrrrsh', when they feel unsafe.

Defence

Black Robins have three main methods of self-defence against other animals or objects entering their territory. **Attacking** was not common, but robins were noted to attack small grassland birds that

intruded into their territory such as rufous-winged bush larks (*Mirafra assamica*). They also attacked reptiles such as skinks (*Eutropis spp.*), garden lizards (*Calotes versicolor*), land monitors (*Varanus bengalensis*) and even snakes like cobras (*Naja naja*) and rat snakes (*Ptyas mucocus*) when they were defending their nests with young. Snakes were chased away by a series of continuous alarm calls, and jumping around the snake and even attacking it with their beaks. But it was observed to show a different behaviour i.e. **Withdrawal** against red-vented bulbuls (*Pycnonotus cafer*) which they frequently encounter while feeding within their territories. In most of their conflicts with bulbuls, black robins retreated giving red-vented bulbul the opportunity to consume

the food. Lack (1953) stated that the European (*Red-breasted*) robin (*Erithacus rubecula*), like other territorial species, make no serious attempts to repel competitors of other species for food. The statement agrees with the reactions of black robin when confronted by red-vented bulbuls, common mynahs (*Acridotheres tristis*) and spotted doves (*Streptopelia chinensis*). The black robins were also recorded **investigating** every new object in their territory with great interest. It was observed that whenever a new object was placed inside their territory they approach it very carefully, and investigate thoroughly, flying, hopping and jumping on and around the object. Figure 1 indicates some behavioural patterns of Black Robin.

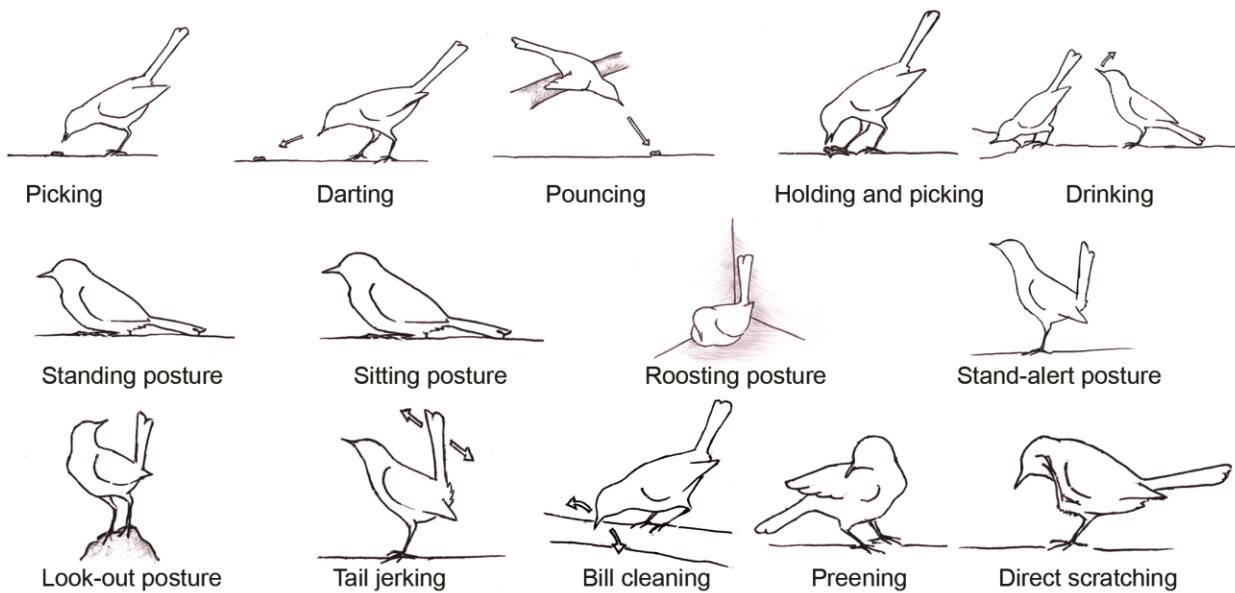


Figure 1. Some behaviour patterns of the black robin *Saxicoloides fulicatus leucopterus*

Locomotion Patterns

Locomotion on land

Terrestrial locomotion of Black Robins is associated with several events such as hopping, running, being alert, tail jerking, jumping and sudden changes of direction, performed without specific order. It is usually associated with foraging. **Hopping** is the regular locomotory method, whereas bipedal locomotion such as running was also observed. **Stand alert posture** was commonly seen in intervals between hops or short runs, and lasted for a very short time. This was performed repeatedly. This behaviour is characterised by being alert with stretched and erected neck and straight body. The tail is either erected or remains down. **Lookout posture** is also performed intermittently while in locomotion. The bird jumps up

on to a termite mound, rock, wall, etc. with a height of 2.74 ± 2.03 ft ($n = 92$) where it remains vigilant for sometime (33.91 ± 39.83 seconds, $n = 92$). Male black robins frequently perform "look-out" behaviour towards neighbouring territories. This could last for as much as 10 minutes. They do this from "look-out posts" along the boundaries of their own territory. A unique event termed here as **tail jerking** could also be seen intermittently during locomotion. The tail is erected and jerked up or sidewise with a corresponding dropping down of its wings as explained by Legge (1880). **Jumping** was recorded when the birds were excited or afraid of something on the ground, where the birds suddenly jumps from one location to another. This is sometimes associated with an alarm call. It gets the propulsive force to jump from its legs; this is not usually associated with wing movements.

Arial Locomotion

Black Robins *fly* frequently but usually over short distances (the maximum distance recorded was approximately 100 m) and only last for few seconds. Flying takes place at heights of 2 to 10 feet above the ground and rarely exceeds ten feet. Black robins use short and rapid wing strokes in performing their jerky flight. They are able to change their flight direction quite rapidly. One bird was even able to avoid a mist-net by reducing its speed and reversing almost immediately after striking the net. They also perform a *short flight*, usually when excited, and mostly associated with a loud alarm call. It lasts only for about two seconds and movement is less than 5 meters. Black robins show *Fly up* behaviour when they need to attain heights up to about 0.5m. Similarly they *glide down* to descend from heights, where the wings are stretched, without flapping. The wings are flapped only at landing in order to reduce speed.

Reproductive Behaviour Patterns

Though courtship and mating behaviour could not be observed during the present study, some pair bonding and nidification behaviours were recorded.

Pair bonding

The full spectrum of pair bonding behaviour was not documented during the present study. Nevertheless, male and female black robins were observed *touching beaks*, while resting on look out posts or when perching in pairs.

Nest building and nidification

Only the male Black Robin is engaged in *Nest building*. They collect nesting material and place them to form the cup-shaped nest mostly within a cavity or depression, taking a period of about two weeks to complete the task. Black Robin nests were recorded in natural cavities like a hollow bamboo and cavities on earth dams, but most were in artificial cavities like wall brackets, upper edges of walls, edges of closed windows, discarded buckets, etc. It was notable that most of Black Robin nests were not well concealed. Black Robins were also recorded using abandoned nests of other species such as White-backed Munia (*Lonchura striata*), and Red-rumped Swallow (*Hirundo daurica*), building their nests in the cavities of those other nests. It was also recorded that a single male makes more than one nest during a

single breeding season. One individual was observed to build three consecutive nests during the same breeding season, within the same territory, where the first two nests failed. Only the female involves in *incubating eggs*. The bird bends its legs and comes to a low position while keeping the tail lifted up wards. The thoracic region rests on the eggs for incubation. *Nest guarding* is primarily a responsibility of the male, who keeps moving around the vicinity of the nest while the female is incubating. It flies between perches near the nest (about 1-5 m away) and keeps on singing. Whenever a threat occurs it gives a loud alarm call and attacks any predators/intruders. At such instances, the female robin also comes out of the nest to guard it, uttering the alarm call. Both parents were observed to perform *nest cleaning*, and the droppings of chicks are taken away from the nest in their beaks. Both parents do *feeding of the brood* until the nestlings grow nearly to the size of an adult. This takes more than one month after hatching. When chicks are still in the nest, the parents alternatively bring them food material. The young are fed frequently (as many as 15 times during 70 minutes in one occasion in the afternoon, where the female fed the brood seven times and the male eight times). Feeding broods is more frequent in the mornings and afternoons and slackens towards midday. The adults continued to feed the fledglings, but with a reducing frequency as they mature.

Henry (1998) recorded the chief nesting season of Black Robins in Sri Lanka as March to September, but we recorded nests even in October from Buttala. The usual clutch size of Black Robins is two, but sometimes three eggs are laid (Phillips, 1951). All the nests recorded during the study ($n = 7$) had a clutch size of two eggs.

Territorial Behaviour Patterns

The song, fighting and display of the robin all centre on acquiring and maintenance of a territory (Lack, 1953). Its territory is the entire area defended by a bird at a given time of its life. In contrast, an area which is regularly used by a bird, but which it does not defend actively, is not a territory and called its living space (Dorst, 1974). Only male Black Robins were observed to defend their territories vigorously, with an aggressive display and occasional attacks on rival robins. Females too usually occupy a territory, but they do not defend it except for performing the territorial song with their mates.

Territorial display: Black Robins perform a very peculiar territorial display, when two males of overlapping territories confront each other at a territory

boundary. The territorial display of Black Robin is described hitherto, with a sequence of five distinct events. These events do not necessarily take place in the order described below. At first both birds **charge each other** with their necks stretched out and bills pointing at each other, with breast feathers puffed out, and tail usually down. Then they **elevate and lower the stretched necks** several times keeping their tails erect. Alternatively they walk side-by-side showing off their white wing patches and chestnut under tail coverts. They do this with erected tail and puffed plumage. **Showing off** colour patches has also been described by Lack, (1953) as a method European Robins (*Erithacus rubecula*) use in defending their territories. After performing this sequence of events for some time they stop looking at each other and show a unique posture termed here as **erecting tail and bill** which has been described by Henry (1998, p.381) as follows. "The male robin adopts a remarkable attitude against a rival robin; he stretches his neck, pointing the bill vertically up, puffs out the breast feathers, white wing-coverts and chestnut under tail coverts, and elevates the tail until it touches the back of his head". **Supplanting attacks** follow their display, if the rival robin does not withdraw to its own territory. Supplanting attacks could sometimes be spontaneous without any preliminary display, when the territory owner sees a rival robin entering its territory. The supplanting attack is described by Trillmich (1976) and Brockway (1964) as flying into or on to another individual. The bird flies straight at its rival and attacks it. Usually the attacked bird escapes by flying away.

Black Robins maintain their territories all year-round. Territorial encounters were recorded throughout the day, but with a high percentage occurring in the afternoons, and none during the midday. Territorial disputes spanned from a minimum of 5 seconds to a maximum of 1 minute (25.42 ± 16.98 seconds, $n = 12$). Only males were involved in disputes. Even if females are present they do not show any territorial behaviour, but act as observers (sometimes with puffed feathers).

In addition to their displays male robins perform a **Territorial song**, which plays a major role in marking their territory. They use several identified trees or song posts along the boundaries of their territories to perform their territorial songs. Male black robins mark their territory boundaries by singing continuously for a long periods perching on these posts. Their songs are especially intensive in the mornings and evenings. They sometimes fly around their territory perching intermittently on the song posts for singing. (Figure 2)

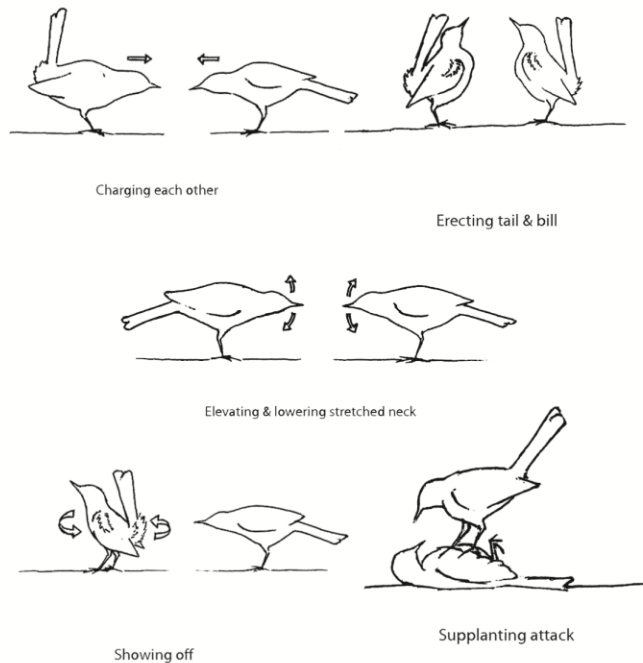


Figure 2. Events in the territorial display of black robin *Saxicoloides fulicatusleucopterus*

Agonistic Behaviour Patterns

A series of agonistic events could be observed among individuals especially males living within the same territory. Most of them occurred between the dominant male and first year males, (before the latter left their parent's territories, in most cases if not all). Agonistic interactions were also observed among females and once between the dominant female and a first year male. **Chasing on ground** is the simplest form of conflict between individuals belonging to the same territory. **Chasing in flight** is associated with occasional attacks using their beaks, which sometimes result in collapse of the attacked bird. **Fighting** was not commonly observed, and could describe as a battle between two males for dominance, as the battle seemed to become more aggressive when the female was nearby. Fights did not occur for long (55 ± 28 seconds, $n = 2$). Fighting was always associated with chasing one another in short flights with intermittent perching and attacks. In vigorous fights, the strategy seems to be to get above the opponent and strike downwards. The winner stands above the loser, which lies on the ground in an upright position for some time.

Concluding Remarks

The Black Robin is an active terrestrial bird with a great variety of behaviours. It spends much of the time moving at random on the ground, usually in open areas. The birds are very alert, always searching around their habitat, and aggressive in their behaviour. Different behavioural events identified during the course of the present study were grouped into major acts, which were then categorised into several different types of behaviour. The ethogram of black robin *Saxicoloides fulicatus leucopterus* constructed during the study will hopefully encourage further studies on their time budgets and diurnal activity patterns, as well as behavioural comparisons between the five recognised sub-species within the Indian sub-continent.

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