

# DISTRIBUTION, STATUS AND BREEDING OF BLACK-THROATED FINCHES *POEPHILA CINCTA* IN NORTHERN QUEENSLAND

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## SUMMARY

ZANN, R. 1976. Distribution, status and breeding of Black-throated Finches *Poephila cincta* in northern Queensland. *Emu* 76: 201-206.

Two subspecies, which have rumps of different colours, are sympatric in some areas at the base of Cape York Peninsula. Interbreeding occurs in one area but not in others. The black-rumped form appears to be extending its range. *P. c. atropygialis* was studied in detail near Mareeba, where it was found in small flocks and nested in colonies. The distribution, location and structure of nests are described. Breeding behaviour is similar to that of the Long-tailed Finch *P. acuticauda*.

## INTRODUCTION

Except for some brief observations made by Keast (1958) and Immelmann (1962, 1967) there has been almost nothing published on the Black-throated Finch *Poephila cincta*. During two trips to northern Queensland I made some observations on the distribution, breeding and behaviour of the black-rumped form, *P. c. atropygialis*.

Approximately ten hours of observations were made at a dam near Coen, Cape York Peninsula, in October 1967. In May 1970 the birds were observed for about fifteen hours during a week at Lynd, west of Townsville, and for about five hours at different localities from Lynd westward to Punchbowl. In early June 1970 two colonies were studied for approximately seventy hours during one week at Barron Channels, sixteen kilometres south-west of Mareeba, Atherton Tableland. Observations were made with 7 x 50 binoculars.

Data on clutch-size, incubation, hatching, brooding and development of young are based on studies of fifty-three recently caught *P. c. cincta* and twenty-one recently caught *P. c. atropygialis*.

## RESULTS

### *Distribution and geographical variation*

Black-throated Finches are found in north-eastern Australia from Inverell in the south (Baldwin 1975) to Cape York in the north. Keast (1958) recognizes three subspecies; the southern *P. c. cincta* has a white rump and the two on Cape York have black rumps. *P. c. nigrotecta*, the more northern of the black-rumped forms, comes south as far as the Upper Archer and Watson Rivers. *P. c. atropygialis* extends from these rivers south to the base of Cape York, where it is sympatric with *P. c. cincta* and interbreeds with it in the most southern parts of its range (Fig. 1).

Keast (1958) discovered them interbreeding at Conjuboy, where he found both black- and white-rumped birds and all intermediate forms. In 1970 at Lynd, fifty kilometres south, I saw a flock of eighteen birds of

which nine had completely black rumps and nine had small patches of white in the centre. No completely white-rumped birds were seen. Signs of interbreeding were found as far west as Forsath, where two black-rumped birds and two intermediates were seen. At Cumberland, sixty kilometres farther west, all birds were black-rumped. Black-rumped birds were found as far west as Punchbowl, thirty-four kilometres east of the Leichhardt River, the western limit of the species.

*P. c. cincta* and *P. c. atropygialis* are known to be sympatric on the Atherton Tableland (Bravery 1970) and at Cooktown (Bravery pers. comm.) but no signs of interbreeding have been reported. Before about 1960 only *P. c. cincta* was observed by Bravery on the Atherton Tableland but by 1964 numbers of *P. c. atropygialis* began to appear regularly and were numerous by 1967. About this time numbers of *P. c. cincta* began to decline over the Shire of Mareeba.

### *Habitat*

*P. c. atropygialis* was observed in habitats ranging from dry open woodland with a few tall eucalypts to a closed two-layered woodland with a variety of tree species. Seeding grasses and locally accessible water-holes were common features of all habitats.

The Mareeba study-area consisted of dense patches of two-layered woodland in a tree savanna (Fig. 2). The dominant woodland trees were *Grevillea pteridifolia*, *G. glauca*, *Melaleuca nervosa* and *M. stenostacha*; the dominant grasses were *Setaria surgens*, *Rhynchelytrum repens*, *Schizachyrium fragile*, *Panicum semindum*, *Aristida superpendens*, *A. ingrata* and *A. calycina*. Three dams and an irrigation channel provided water.

### *Feeding and drinking behaviour*

*P. c. atropygialis* fed mainly in the early morning and late afternoon on seeds that had fallen from the ground from ripened grassheads. Occasionally, half-ripe seeds were removed from the grasshead by the bird stretching up from the ground and removing each seed

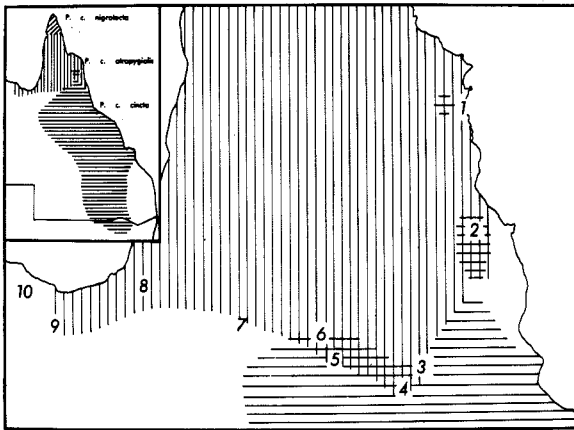


Figure 1. Distribution of Black-throated Finches *Poephila cincta*. Localities: 1 Cooktown, 2 Mareeba, 3 Conju-booy, 4 Lynd, 5 Forsath, 6 Cumberland, 7 Croydon, 8 Normanton, 9 Punchbowl, 10 Burketown.

separately or by leaping up and seizing the stem below the spike, then using the weight of the body to pull it to the ground where one foot was clamped firmly on it and the seeds eaten one by one. Seeds of the following grasses were eaten: *Setaria surgens*, *Digitaria ciliaris*, *Stylosanthes humilis* and *Dactyloctenium radulans*. Flocks fed silently in a dispersed group of family units, so that, for example, fifteen to twenty individuals were irregularly dispersed over an area of ten to fifteen square metres.

*P. c. atropygialis* drank by sucking; the partially open beak was held submerged for a few seconds as the water was sucked up. In dry periods they drank usually in the early morning leaving their breeding area in small loose flocks and breaking up into small family parties round the water-hole. Near Coen, they aggregated in hundreds round water-holes together with similar numbers of White-eared Finches *Poephila personata leucotis*. In well-watered regions, such as Mareeba, there were no regular drinking times; small groups drank throughout the day although larger numbers drank around 08:00 and 16:00.

#### Behaviour in groups

Black-throated Finches were highly social. They lived in small flocks of twelve to thirty individuals (Table I) although nomadic flocks of several hundred may aggregate round water-holes during droughts. Most activities occurred in groups within the nesting area (Table II) and the pair was the most frequent size of group observed. Family groups consisting of parents and offspring were also conspicuous units in and round the nesting area. The size of twenty-one families ranged from three to eight with a mean of six.

When moving from one feeding site to another the members of a flock tended to move at roughly the same time in the same direction but in flight they formed scat-

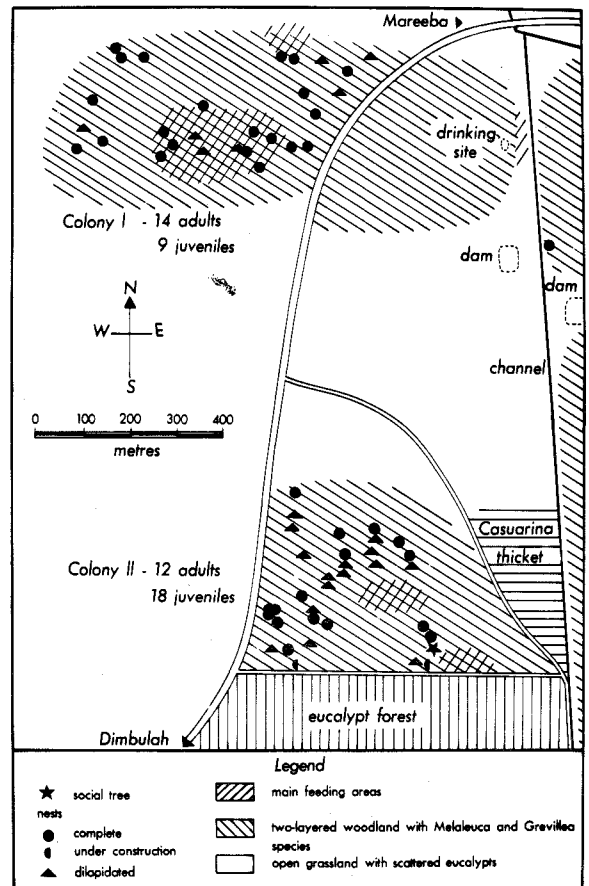


Figure 2. Breeding colonies of *P. c. atropygialis* at Barron Channels, 16 km south-west of Mareeba.

tered separate groups in which most birds were strung out one behind the other, about 0.5 – 2 metres apart. Short contact calls were given just before take-off and during flight. These calls probably helped synchronize movements. Single birds emitted distance-calls, which could be heard in the nesting area throughout the day; they were answered in kind by other birds in the area. Distance-calls probably helped birds to find the flock and kept them within the nesting area. The calls of *P. cincta* and related species have been more fully described by Zann (1975).

Several times each day most members in the nesting area gathered in the top branches of a low dead tree where they held a 'social meeting'. As each bird landed it gave several deep jerks of the head and it was greeted by each nearby bird with a special display: the bird bowed down, pivoted its head and pointed the beak directly up at the head of the alighting bird; it rapidly opened and shut its beak a number of times (mandibulation) and emitted a series of soft short notes. After the greetings the birds hopped about among each other and the

TABLE I  
Sizes of flocks observed during May-June 1970

Locality	Number of Individuals
Lynd	20
Forsath	12
Cumberland	21
Croydon	14
Punchbowl	13
Mareeba I	23
Mareeba II	30

Except for the Mareeba flocks numbers may be underestimated because I did not have enough time for thorough censuses in some areas.

members of a pair often preened each other. Soon afterwards the pairs and families left the meeting.

The Mareeba study-area had two separate nesting areas occupied by two distinct flocks, which were not seen to make contact during my study. The nests were used for breeding and roosting purposes.

#### Breeding

The presence of many newly fledged young at Coen in October 1967 was evidence that many birds had just bred. In June 1970 at Mareeba almost half the members of flocks were juveniles and some adult birds were observed building, incubating, brooding and feeding fledgelings. These observations agree well with Immel-

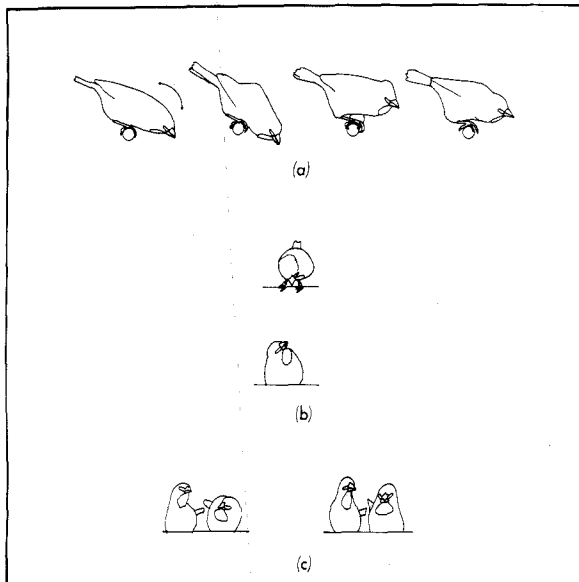


Figure 3. Displays at the nest site. (a) Head-down-tail-fanned display at the site of the future nest. (b) Male mandibulates at the female above in order to attract her to him at the nest site. (c) Mutual display between male and female at the nest site. Drawings traced from films.

TABLE II  
Frequency at which different sizes of flocks were observed during various activities within the nesting area

Flock Size	Activities					Total
	Feed- ing	Drink- ing	Fly- ing	Rest- ing	Repro- ductive	
1	2		74	8	8	92
2	2	3	81	26	7	119
3	1		33	11		45
4	1	1	16	4	1	23
5	2	3	8	1		14
6	2		8	1		11
7			5	1		6
8			1			1
9	1	1				2
10				1		1
11	1					1
12	1					1
13						0
14	1					1
15		1		1		2
16						0
17						0
18	1	1				2
19	1					1
20	2		1			3
21						0
22						0
23	1					1
Total No of observations	19	10	227	54	16	326

mann's (1967) statement that they breed in the wet season from September to May; Bravery (1970) however, found them breeding only between September and January on the Atherton Tableland.

Whether breeding or not, the pair appeared to be the basic unit of the group; where one mate went the other always followed, the female usually leading. Sexual partners were rarely more than a metre or two apart in flight and when perched they sat in contact, usually allopreening, or only a few centimetres apart. Partners roosted in the same nest and were not seen to fight.

#### Behaviour at the nest-site

Both sexes searched together for a suitable site. The male led and 'proposed' sites; the female followed. On a site the male hopped to and fro with the plumage of the head and throat ruffled as he softly cackled and nibbled, pulled and pushed stems and made other nest-building movements in the air. If the female approached he attempted to solicit her to the site, at first by leading her to it and, then, at the site he bowed down, fanned his tail and mandibulated (Fig. 3a). Long low rasping-whining

sounds were emitted. The female found most sites unsuitable and flew off. She signalled her acceptance of a site by joining the male and sitting in contact with him; here they mutually displayed to one another with mandibulations and whining calls (Fig. 3c).

#### Location of the nest

In the Mareeba area the two discrete nesting areas of Black-throated Finches were about 800 metres apart (Fig. 2). Colony I had thirty complete nests separated on average by  $8.9 \pm 4.5$  (mean  $\pm$  SD) metres (range 2.6 – 17 m); Colony II had thirty-seven complete nests, on average  $9.7 \pm 7.3$  metres (range 0.6 – 39 m) apart.

Of seventy-one nests examined, sixty were in *Melaleuca nervosa* and *M. stenostacha*, four in eucalypts (including *E. pruinosa*), two in *Grevillea pteridifolia*, two in mistletoe, two in *Zizyphus mauritania* and one in an unidentified acacia bush. Most nests were in clumps of twigs among the top outermost branches of pendent limbs and rested on horizontal forks or were wedged between vertical twigs (Fig. 4). Almost all nests were found in the upper half of the tree and sixty per cent of these were in the top fifth. No significant preference ( $\chi^2 = 1.69$ , 3 df) was shown for facing the entrance in any direction.

#### Nest and building

Both male and female built. Each bird carried and added its own stem to the nest. The male carried from sixty-five to eighty per cent of the stems while the female stayed in the nest re-arranging the material. In bouts of building the interval between successive stems being added to the nest varied from one to six minutes. I saw four basic building movements. The most frequent (60 – 70%) is the 'push-up': the stem was carried to the nest by one end and pushed up and anchored at the top. Other movements, the 'push out', the 'pull-in' and the 'push down' occurred in roughly the same proportions and served to re-arrange the grass stems and to mould the nest chamber.

Nests were built from the bottom upwards with the

stems being added from the inside. A supporting platform was formed first. Long stiff grass stems were arranged loosely on the long axis of the future nest and a few short stems were criss-crossed between them. The floor, sides, roof, rear wall and entrance tube were built in that order. Lastly the nest chamber was lined, usually after several eggs had been laid.

Like most grassfinches the nest of the Black-throated Finch is built from grass stems and consists of a roughly spherical chamber with a side entrance tube attached half-way up. Typical nests consisted of five parts: a platform of heavy horizontal stems, a heavy spiny outer layer of long stiff dead stems, a spherical inner layer of finely matted, soft flexible stems, an entrance tube of long stiff stems and a thin layer of fine soft grass heads and feathers lining the cavity (Fig. 4). Dimensions of five nests are shown in Table III.

#### Courtship and copulation

Courtship consisted of a preliminary dance by both birds followed by a short song by the male after which the female invited copulation. On dismounting the partners performed a special greeting ceremony. *P. c. atropygialis* emits the song more frequently than does *P. c. cincta*. Detailed descriptions of courtship can be found elsewhere (Zann in press).

#### Clutch-size, incubation, hatching and brooding

These aspects were studied in an aviary among birds recently caught. The mean and standard deviation of twenty-one clutches of *P. c. cincta* was  $5.1 \pm 0.9$  and for fifteen clutches of *P. c. atropygialis*  $4.6 \pm 0.06$ ; the difference in size just failing to reach significance ( $t = 1.92$ , 34 df,  $0.10 > P > 0.05$ ).

One egg was laid each day and incubation began about the time the fourth egg was laid. Both sexes incubated alternately, changing over at regular intervals of thirty to forty minutes. Birds met in the nest chamber, the relieving bird often carrying a soft stem or feather which it pushed into the wall on entering; they greeted one another with soft calls and mandibulations. Just before the eggs hatched the incubating bird remained in the nest when danger was near so that wild birds could be caught by hand in the nest chamber.

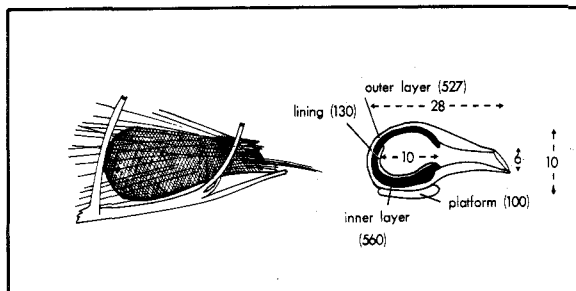


Figure 4. A typical nest of *P. c. atropygialis* from the Mareeba area. On left, nest is sketched from side. Diagrammatic representation of parts of nest is shown on the right. Figures in brackets are number of components contained in each part. The dimensions in centimetres.

TABLE III  
Measurements (cm) of five nests of Black-throated Finches

Length	21 – 28
Height	9 – 17
Width	9 – 12
Length of entrance tube	7 – 12
Diameter of entrance tube	4 – 6
Inner width of nest-cavity	6 – 10
Number of components	900 – 1,200
Longest stem	48
Stem length of outer wall	8 – 48
Stem length of inner wall	6 – 23

Although the parents sat on the eggs for long periods they were not warmed until after the fourth egg was laid when regular bouts of incubation began. The mean ( $\pm$ SD) incubation time from the fourth egg laid to the first hatched for nine clutches of *P. c. cincta* was  $14.6 \pm 1.7$  days and for ten clutches of *P. c. atropygialis*  $15.3 \pm 1.7$  days; the differences, however, were not statistically significant. Two or three eggs hatched in one day; one at dawn, the second about three hours later and the third in the early afternoon; the fourth and fifth hatched on the morning of the second day. Eggs hatched in about eighty minutes and the two halves of the shell were eaten immediately by the parents.

Both parents brooded and fed the young. Brooding occurred continuously until the seventh day after hatching, when the nestlings were unattended for short periods. After the tenth day the young were brooded only for short periods after each feed. The parents ceased roosting with the young between the twelfth and fifteenth night after hatching; they roosted in a nest nearby.

#### Development of the young

The morphological and behavioural development of Black-throated Finches differs only slightly from what Immelmann (1962) documented for the Australian grassfinches in general. Development is slightly faster in *P. cincta* than it is in the closely related Long-tailed Finch *P. acuticauda* although both fledge after a nestling period of about three weeks. The progeny of wild-caught birds fledged after  $21.9 \pm 0.9$  (mean  $\pm$  SD) days (twelve clutches) in *P. c. cincta* and  $21.2 \pm 2.6$  days (five clutches) in *P. c. atropygialis*. After fledging the young were led to a newly built, roosting nest.

The nestlings of *P. cincta* had a pale-yellow palate with a conspicuous pattern of black markings (Fig. 5). The markings varied slightly among siblings but the palate markings of the two subspecies were indistinguishable. The top horseshoe-shaped mark was more extensive than that depicted by Immelmann (1967).

Nestlings begged for food in three ways. The 'neck-down' position had the neck on the floor and the head and gaping beak turned upwards. In the 'neck-up' position the neck was extended up at forty to eighty degrees from the horizontal. The third posture was the 'head-down-neck-twist', which is unique to grassfinches. The neck was twisted so that the head was held down to one side and the beak gaped upwards; occasionally the opposite wing was raised and extended. The frequency with which the begging postures changed depended on the age of the nestlings and the intensity of begging. 'Neck-down' was a low intensity posture, which occurred at the start of a begging bout but could change to the neck-twist position as intensity of begging increases. This transition began on the day of hatching but 'neck-up' became less frequent, never being observed after the thirteenth day of life.

Young Black-throated Finches first fed themselves

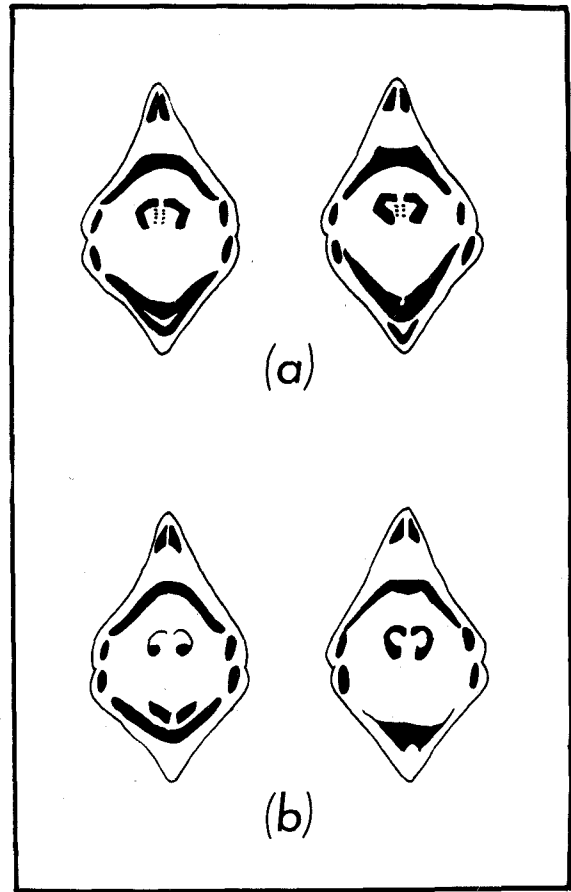


Figure 5. Palate markings. (a) *P. c. cincta*, (b) *P. c. atropygialis*.

about four days after fledging and became fully independent in another two weeks. Family members did not disperse after independence but were seen together when several months old.

#### DISCUSSION

According to Keast (1958) the pattern of distribution of *P. c. cincta* and *P. c. atropygialis* suggests that the former is extending its range north into the dry country at the base of Cape York. My data suggest the opposite, at least in the short term. The zone of interbreeding appears to have moved about fifty kilometres south since Keast discovered it. Furthermore, the areas of sympatry have far more black-rumped than white-rumped forms suggesting that the former are pushing south. Bravery (pers. comm.) thought that the increase of *P. c. atropygialis* and the simultaneous decline of *P. c. cincta* in the Mareeba area was related to large-scale clearing for tobacco production and pasture improvement that began in the 1960s. The concomitant development of extensive irrigation systems in the area pro-

vided a habitat with plenty of permanent sources of water and always some green grasses in seed. These changes may have allowed *P. c. atropygialis* to invade the area.

The distribution of nests in the Mareeba area indicates that breeding pairs were attracted to each other. The vegetation round Colony II provided many evenly distributed sites; yet the nests were clumped, e.g. five nests in one tree. Consequently, it is correct to speak of a breeding colony. It is not known whether birds reside in these colonies throughout the year but the presence of a number of non-breeding adults in the two colonies suggests that this might be so. The closely related Long-tailed Finch also breeds in colonies (Immelmann 1967) but their nests are more dispersed than those that I have described for the Black-throated Finch.

Each colony had many complete but unused nests, suggesting that some of the birds had left the area after the nests were built or that vacant nests were old ones and new nests were required for each successive breeding attempt.

The nest of the Black-throated Finch is similar to that described by Immelmann (1962) for the Long-tailed Finch but it is a heavier structure and has a slightly longer entrance tube.

Immelmann (1967) stated that the transition from the 'neck-up' food-begging posture of the young to the

neck-twist position is characteristic for each species, whereas my observations on *P. cincta* and related species indicate that there is no special age when the transition occurs and that it is mainly a function of begging intensity.

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