THE BLACK HONEYEATER: NOMAD OR MIGRANT?

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INTRODUCTION

The Black Honeyeater *Myzomela nigra* is a rare visitor to the wetter coastal districts, where it is believed to occur in times of extreme drought inland. In the more arid parts of Australia it appears to be quite numerous in some years and absent in others. The species has been described as an "ultra-nomad" by Keast (1968), who defines nomadism as "a non-repetitive or only partly repetitive form of seasonal movement," and (elsewhere) as "random." Keast reached this conclusion after extensively reviewing honeyeater occurrences throughout Australia.

Although the description of random nomad may seem appropriate, it is probably only an admission of our lack of knowledge, as there is likely to be some pattern, albeit complex, in the movements of this species. In fact Keast mentions that there is an overall north-south movement, with records from the northern part of the continent in winter and from the south in spring and summer.

In this paper I summarise the many observations made during spring and summer 1975-76, and also previous reports of the species in South Australia. I also consider observations from elsewhere in Australia and integrate the patterns which are shown.

OBSERVATIONS IN 1975

All records of Black Honeyeaters in South Australia in 1975 and early 1976, on which I have received information, are given in Table 1. The first birds were seen in late August, and larger numbers appeared over a wide area in the second half of September and early October. They were present for three months or more near Sedan and at Braendler's and Wundersitz Scrub (near Monarto). A few observations were made in January 1976, and there was one very late and southerly record from near Bordertown in February. Most observations were in the Murray Mallee as far south as Finniss (edge of the Mount Lofty Ranges), Monarto, Billiatt and Bordertown.

Breeding took place near Sedan (several pairs) in October to December, near Billiatt in October, and in the Monarto area in September and October.

Several people made notes on feeding. Black Honeyeaters visited the flowers of *Eremophila longifolia* at Port Wakefield, *Eremophila oppositifolia* at Bower and Mt. Mary, *Eucalyptus incrassata* at Billiatt and Braendler's Scrub and *Grevilla ilicifolia* at Braendler's Scrub. They were also frequently seen hawking for small insects, probably midges (Diptera). Parker (*in litt.*) saw Black Honeyeaters feeding on *Grevil-*

TABLE 1 — Records of Black Honeyeaters in South Australia in 1975-76. Number in parentheses after the date refer to number of dates on which observed. (MM, Murray Mallee; SE, South East; LN, Lower North; NW, North West.)

DATE	PLACE	OBSERVER
End August-November	NE of Sedan (MM)	M. E. Ritchie
13-9-75	Billa Kalina (NW)	P. Langdon
20-9-75 and 19-10-75 (2)	Monarto (MM)	K. Thiele, A. Black
20-9-75	Finniss (MM)	J. Endersby
21-9-75 and 5-10-75 (2)	W of Morgan (MM)	L. Pedler
24-9-75 to 19-10-75 (4)	W of Bower (MM)	E. Boehm
26-9-75	Port Wakefield (LN)	L. Pedler
28-9-75 to 1-1-76 (3)	Wundersitz near Hartley (MM)	S.A.O.A. outing, J. Saunders
28-9-75 to 16-12-76 (5)	Braendler's Scrub, Monarto (MM)	S.A.O.A. outing, M. McNamara, K. Edwards
5-10-75	SE of Cambrai (MM)	N. Reid, M. Opie
11-10-75 to 13-10-75	Billiatt (MM)	S.A.O.A. outing
13-10-75	Mt. Mary (MM)	L. Pedler
19-10-75	Towitta (MM)	N. Peart
8-11-75 to 9-11-75	Ramco (MM)	J. B. Paton
8-11-75 to 9-11-75	Swan Reach NP (MM)	J. B. Paton
27-11-75	SE of Murray Bridge (MM)	R. Jaensch
17-1-76	Brookfield (MM)	H. Ford
23-1-76	Ridley Reserve (MM)	H. Laybourne-Smith
18-2-76	30 km SW of Bordertown (SE)	M. E. Ritchie

(19 records on 30 dates)

lea wickhamii in Northern Territory in 1968 and 1970. Also Lovell (*in litt.*) noted them feeding on *Grevillea eriostachya* in Western Australia, and on *Eucalyptus kingsmilli* in the Northern Territory. Thus Black Honeyeaters visit a range of flowers and are not as dependent on flowering *Eremophila* as suggested by Hobbs (1967); in fact in the Monarto and Billiatt areas where they were moderately common in 1975 *Eremophila* is scarce. Ecologically the Black Honeyeater would seem to be similar to other long-beaked honeyeaters. (Ford and Paton 1977).

Five birds, all males, were caught and banded at Braendler's Scrub (four on October 29 and one on November 25). Their mean measurements were: beak length 16.8 mm; wing length (worn) 66.5 mm, tail length (worn) 38.5 mm and weight 7.8 grams. The last of these measurements shows just how small the bird is: for comparison the Eastern Spinebill *Acanthorhynchus tenuirostris,* Silvereye *Zosterops lateralis* and Striated Pardalote *Pardalotus striatus* all weigh 10-11 grams. The wing however is very long for such a small bird; and Keast has attributed this feature to its highly nomadic way of life. Wing length may also be affected by feeding behaviour; hummingbirds which visit scattered flowering bushes have proportionally longer wings than those which are territorial around a single bush (Feinsinger and Chaplin, 1975).

The bird caught on November 25 was in moult: right wing primary score 14, and left wing primary score 16 (on the 0 (old) to 5 (fully grown new) scale of feather growth used by C.S.I.R.O.) The old feathers were very brown whereas the new ones were a clean black. Pedler (pers. comm.) mentions that the males he saw near Port Wakefield on September 26 were very brownish and shabby looking.

Several observers commented on the "pee-pee" call, and a few also on the song, which I would describe as sweet and chattery, slightly like that of a Brown-headed Honeyeater. Pedler (per. comm.) described the display; "a male would fly slightly above tree-top level with a dipping flight. At the highest point of each rise after a dip the wings would be held rigid pointing slightly below horizontal and the head raised to give a pee-pee call. This would be repeated several times in a short flight. Once during one of these display flights the male dropped vertically for a couple of metres with his wings folded and tail slightly fanned just like the picture by Slater of the Pied Honeyeater in McDonald's 'Birds of Australia'." The dipping flight reminded me very much of a chat *Ephthianura,* although at times it was very fast more like a Mistletoebird *Dicaeum hirundinaceum.*

OBSERVATIONS BEFORE 1975

All records of Black Honeyeaters in South Australia, taken from the *South Australian Ornithologist,* are summarised in Table 2. There were frequently several records for a single year followed by a gap of five or six years until the next record. Years in which there may have been an influx into South Australia are 1917, 1918, 1932, 1946, 1951, 1963, 1964, 1965, and 1970. In western Victoria, Black Honeyeaters have also been recorded in some years but not others. For instance, they bred near Bendigo in 1922, 1928, 1929 and 1937 (Milne 1938),

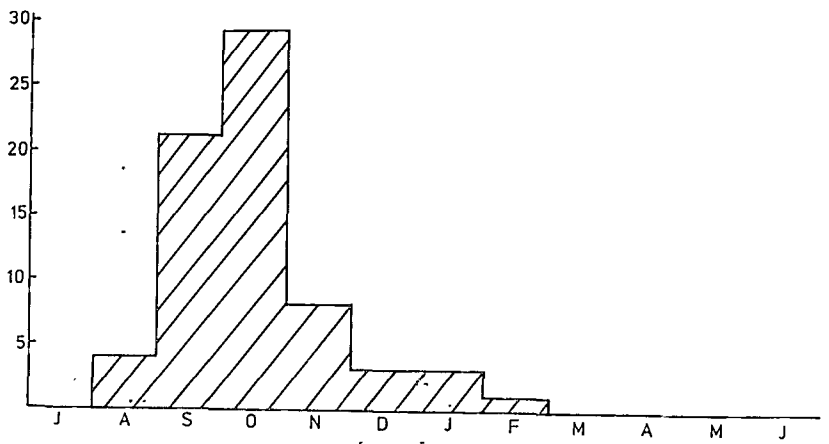

FIGURE 1. *Monthly occurrences of Black Honeyeaters in South Australia, 1901-1976.*

not necessarily years in which they were recorded in South Australia.

The majority of records (75%) were from September and October, and almost all the rest were in August, November and December. Thus the seasonal pattern shown in 1975 was probably true of most years. Monthly occurrences (1901-1975) are summarised in Figure 1.

DISCUSSION

The occurrences of the Black Honeyeater in South Australia fall into a reasonable pattern. It arrives in spring, stays for two or three months, often breeds and then disappears in summer. Numbers appear to vary greatly from year to year. It may be moderately common in some years but not recorded in others. The observations for 1975 agree well with this pattern, except that a few birds may have lingered rather later than in other years.

One should be cautious about drawing conclusions from observations of a species which, even when described as common, is still only thinly distributed over a large area which is not well covered by ornithologists. The pattern of annual occurrences in South Australia, summarised in Table 5 (Appendix 1), can be explained by one of three hypotheses.

i) Black Honeyeaters are equally common in all years, and the number of observations depends on chance alone.

ii) Black Honeyeaters differ in abundance in South Australia from year to year, either because a) their overall distribution changes, (they may be absent from South Australia but common in another part of Australia), or b) their abundance throughout their range changes with their distribution staying the same. These two alternatives are shown hypothetically in Figure 2.

TABLE 2 — Black Honeyeater records from South Australia, 1901-1974, or neighbouring parts of Victoria, New South Wales and Queensland. Reference is to volume and page in *S. Aust. Orn.* (MLR, Mount Lofty Ranges, MM, Murray Mallee.)

DATE	PLACE	SOURCE		NOTES
Oct. 1909	Tea Tree Gully (MLR)	Angove	*6*, 114	nest and eggs*
Sept. 1917	Pungonda (MM)	Parsons	*3*, 141	"all places visited"*
Sept.-Oct. 1917	NE. (& Qld. & N.S.W.)	Chenery	*6*, 22	"a few noted"
Sept. 1918	Hawker	Parsons	—*	
Oct. 1918	Loxton (MM)	—	*4*, 39	"moderately plentiful"
(Oct. 1918	Wentworth (Vic.)	Sutton	*5*, 76)	
Oct. 1922	Aldgate (MLR)	Chenery	*7*, 24	
(Aug.-Sept. 1923	W. N.S.W. & W. Qld.	Boehm	*7*, 215	many)
Sept. 1931	Sutherlands (MM)	McGilp	*12*, 154	possible sighting
Aug. 1932	Carriewerloo (NW)	Gray	*11*, 222	'fairly common"
Sept. 1932	Orroroo (LN)	—	*12*, 96	several
Oct. 1932	Woodside (MLR)	—	*12*, 66	three
Oct. 1932	One Tree Hill (MLR)	McGilp	—	eggs in S.A. Museum*
1936?	Kinchina	Terrill	*16*, 57	40-50
Oct. 1937	Carriewerloo (NW)	McGilp	*14*, 133	five
Aug. 1943	Granite Downs (NW)	McGilp	*17*, 2	"quite numerous"
Sept. 1946	Monarto (MM)	Lendon	*18*, 21	
Sept. 1946	Tea Tree Gully (MLR)	Terrill and Rix	*19*, 94	several pairs
Oct. 1946	Macclesfield (MLR)	Terrill and Rix	*19*, 94	breeding
Nov. 1946	Tailem Bend (MM)	Lendon	*18*, 47	
Sept.-Nov. 1951	Tailem Bend (two records) Naturi, Sandleton (all MM)	Glover and others	*20*, 90	numerous and breeding
Dec. 1951	Pinnaroo (SE)	Condon	*20*, 90	
Sept.-Dec. 1963	Waikerie (MM)	Mack	*24*, 23	large numbers
Sept. 1963	Calperum (NE)	Mack	*24*, 126	
Oct. 1963	Bower (MM)	Waterman	*23*, 23	three
Oct. 1963	Para Wirra (MLR)	Clark	*24*, 118	
Oct. 1964	Peebinga (SE)	Waterman	*24*, 57	three
1964?	Berri-Waikerie (MM)	Mack	*24*, 57	
Sept. 1965	Plumbago (NE)	Furness	*25*, 126	
Sept. 1965	Sandleton (MM)	Glover	*24*, 98	several
Oct. 1968	Sturt Vale (NE)	Eckert	*25*, 126	
Aug. 1969	Adelaide	Arthur	*26*, 32	two
Oct. 1970	Lilydale (NE)	Mack	*26*, 98	two
Oct. 1970	Berri (MM)	Mack	*26*, 98	
Oct. 1970	Waikerie (MM)	Mack	*26*, 98	12
Oct. 1970	Glenburr Scrub (MM)	Cox	*26*, 98	two

* Specimen of eggs or skin in S.A. Museum.

The distribution hypothesis appears the most popular (see Keast 1968) though the other two have hardly been considered.

The first hypothesis can be tested statistically with the South Australian records, if certain assumptions are made. I have included details of this analysis in Appendix I. The conclusions are that there are too many years with no records or four or more records, and too few years with one, two or three records for the different number of observations to be due to chance alone. Therefore Black Honeyeaters differ in abundance in South Australia from year to year.

It is far harder to discriminate between the other two (distribution and abundance) hypotheses; and most likely the explanation involves both. An area would have to be covered very thoroughly for one to be certain that a species is absent, especially when in the years in which it is reported there are less than three records on average. Several pieces of information, mostly from outside South Australia give some support to the third hypothesis (variation in abundance rather than distribution).

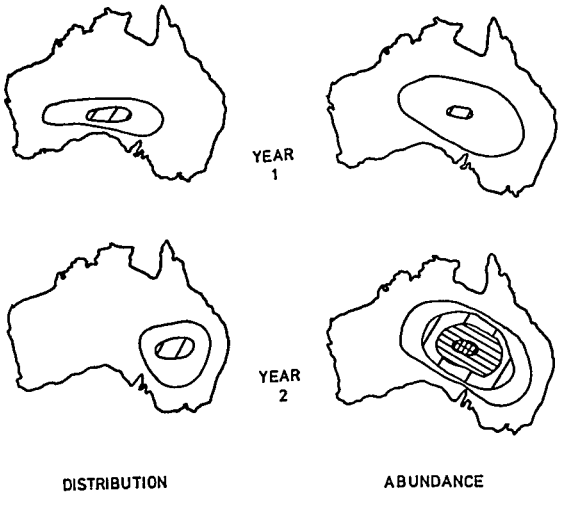

FIGURE 2. *Two hypotheses to account for differences in local abundance of a species.*

(a) Distribution may change from one year to the next. This would happen if the species was nomadic, and tended to leave areas where food (or some other resource) is scarce, and remain in areas where it is sufficient.

(b) Total abundance may change from one year to the next. This would be shown in a resident or regularly migratory species whose population size is greatly affected by highly fluctuating abundance of food (or some other resource).

Firstly, a highly nomadic species might be expected to occur at almost any time of year, whereas Black Honeyeaters are very clearly spring and early summer visitors to South Australia.

Secondly one might expect a nomadic species to be common in South Australia at a time when it was rare elsewhere, and common elsewhere when it was absent from South Australia. Records from inland New South Wales over the last few years (*Aust Birds,* vols. 5-11) show that Black Honeyeaters had a small irruption in 1965 (Hobbs 1967), "a small influx" in 1970 and there were "many more records than usual" in 1975. These were all years when Black Honeyeaters were recorded in South Australia. There were only a few records in each of 1972, 1973, 1974 and 1976, and none in 1971 from New South Wales. In 1965 Black Honeyeaters were recorded at Hattah, Victoria (*Emu* 66, 150).

There are also records from northern inland Australia in 1963, 1968, 1969, 1970 and 1975 (Table 3), all years when Black Honeyeaters were reported from South Australia. All recent records from New South Wales and Victoria were between August and December, except for a mention that some were sighted throughout the winter (1973) on Goorimpah Station, north-west N.S.W. (*Aust Birds,* vol. 8). This is more consistent with a regular seasonal movement and variation in abundance rather than distribution.

Thirdly, the reasons for movements have to be considered. Birds move, usually locally but sometimes over long distances, when they encounter food shortages. This is true of many species, not only nectar-feeders but also fruit-, seed- and insect-feeders. Several species of birds (e.g. Waxwings *Bombycilla* and Crossbills *Loxia*) in northern Europe and the colder parts of North America erupt southwards in years of shortage of fruit, berries and seeds (Bock and Lepthein, 1976). This is a straight-forward behavioural response, which, if it was shown frequently and over a moderate distance, I would call nomadism. Birds also respond to other stimuli such as day length and move out *in anticipation* of food shortage, even if on occasions food is not short in the area which they leave. This is an evolutionary response that I would call true migration. If Black Honeyeaters showed a movement into South Australia, and presumably out of northern

inland Australia, in response to periodic food shortages then we would have good reason to call them nomadic.

Keast (1968) suggested that Black Honeyeaters irrupt into southern Australia in years of drought inland. However, although some years of widespread occurrence of Black Honeyeaters in South Australia coincide with droughts in central Australia (e.g. 1918, 1963, 1965, and 1969), most do not. In the drought years 1927-29, 1959 and 1961, no Black Honeyeaters were recorded in South Australia. Only 17% of the records were from 17 years of drought (23% of 75 years) in central Australia, and only 6% of records were from the 12 years (16%) of drought in southern South Australia (Table 4, data on droughts from Heathcote 1973). There are two major weaknesses in trying to correlate drought with occurrences of Black Honeyeaters. First, drought is an agricultural and social phenomenon more than a biological one. Factors which affect the yield of wheat or survival of sheep and cattle will not necessarily affect the flowering of shrubs which provide food for honeyeaters. In fact Davies (1976) has shown that many shrubs in arid Western Australia, including *Eremophila* flower predictably from year to year although the amount of fruit produced is often correlated with summer rainfall. Secondly, no recorded drought has affected all of inland Australia; and even in 1961 and 1965 there were areas receiving above average rainfall. Survival and movements of Black Honeyeaters will be affected by local climatic conditions which could not be considered in Table 4.

If Black Honeyeaters do not occur in South Australia as a result of inland droughts, one would expect widespread reports to occur after several favourable seasons when numbers have increased. 1975 seems to fit this pattern. It was a wet year, as were 1973 and 1974, and in September 1975 several species of *Eremophila, Hakea* and *Amyema* were in full flower near Alice Springs. At least one species of *Eremophila* was in flower around Oodnadatta, and *Grevillea* was flowering in the Simpson Desert (personal observations). This is not consistent with the hypothesis that Black Honeyeaters had left the centre in response to food shortage. Although I did not see Black Honeyeaters near Alice Springs they were common and breeding near Ayers Rock in August 1975 (D. Roff pers. comm.). It seems reasonable to assume that Black Honeyeaters had increased in abundance in response to plentiful food over several seasons. Perhaps at the same time they showed a greater tendency to overshoot, to move further south than usual.

If Black Honeyeaters occur in inland Australia mostly south of the tropics between August and December in at least some years, where are they between December and August? Keast (1968) says that there are winter records from the north of the continent, and that there is a passage through central Queensland in April-May (north?). and back again in August-September. The Black Honeyeater is a seasonal visitor (autumn?) to the Mt. Isa area; apparently does not reach Katherine, nor the Kimberleys; is only spasmodic in the Barlee Range (W.A.), and is erratic and infrequent in the

TABLE 3 — Recent records of Black Honeyeaters from the northern part of Australia.

DATE	PLACE	SOURCE
May 1962	Wauchope, N.T.	S.A. Museum
June 1962	Barrow Creek, N.T.	Parker 1969
June 1962	Frewena, N.T.	Parker 1969
September 1962	Mt. Isa, Qld.	Horton 1975
August 1963	88 km N of Alice Springs, N.T.	Parker 1969
August 1967	53 km W of Frewena, N.T.	Parker 1969
February 1968	Mt. Isa, Qld.	Horton 1975
June 1968	Stuart Bluff Range, N.T.	Parker (*in litt.*)
September 1968	Barrow Creek-Wauchope, N.T.	Lovell (*in litt.*)
May 1969	Mt. Isa, Qld.	Horton 1975
September 1969	Lyndon and Yannarie R., W.A.	Lovell (*in litt.*)
August 1970	Tanami Desert, N.T.	Parker (*in litt.*)
August 1970	False Mt. Russell, N.T.	Parker (*in litt.*)
September 1971	Opalton, Qld.	Gill 1973
January 1972	Cheviot and Forsyth Ranges, Qld.	Ford and Parker 1974
April-May 1973	Opalton, Qld.	Gill 1973
September 1976	Cuddapan Station, W. Qld.	Lovell (*in litt.*)
October 1977	Ammaroo Station, N.T.	Parker (*in litt.*)

Macdonnell Ranges (cf. comments in last paragraph and more recent records in next paragraph). (All orginal references are quoted Keast (1968)). Gannon (1962) gives records as far north as Mitchell River (Cape York Peninsula), James Range (N.T.) and Pilbara, Onslow and Barlee Range (W.A.). Unfortunately he gives no dates.

Eighteen recent records (recorded or published since 1968) of Black Honeyeaters from northern Australia are shown in Table 3. It is interesting that the majority of records are for August-October, the same season in which they occur in the south. Six records are for May or June, and one each for January and February. The peaks of occurrence coincide with Keast's suggested times of passage through central Queensland; alternatively the birds may be moving south from May to September with some remaining to breed. Whichever explanation is correct, there is still a gap from January to April to account for. There appear to be three possibilities; i) they go to places rarely visited by ornithologists, ii) they experience considerable mortality or iii) they disperse more widely within northern Australia and become much less conspicuous.

Far more information is needed from northern Australia before we can choose between these alternatives. Mortality is unlikely to be high every year though it may be in some years. I favour the third possibility, for honeyeaters generally become inconspicuous in summer and early autumn, probably because they disperse more widely and feed more on insects, rather than concentrating on rich sources of nectar.

CONCLUSIONS

I have more data on occurrences of the Black Honeyeater, particularly in South Australia, than Keast had, and I disagree with his conclusion that Black Honeyeaters are ultra-nomads. The following are my tentative conclusions:

1. The whole population undergoes a great variation in abundance from year to year.
2. It expands its range every spring into southern inland Australia, and contracts again into northern inland Australia in late summer.
3. The amplitude of this expansion may change from year to year, depending upon abundance.
4. Variation in the number of observations each year in South Australia are the result of changes in overall abundance rather than simply presence and absence.

TABLE 4 — Occurrence of Black Honeyeaters in South Australia in years of drought in inland Australia and in southern South Australia 1901-1975 (Heathcote 1973).

	No. of years	Black Honeyeater records
1. Drought years in Centre (1902, 1905, 1915, 1918, 1919, 1924, 1927, 1928, 1929, 1935, 1944, 1959, 1961, 1963, 1964, 1965, 1969)	17	11
2. Non-drought years in Centre	58	45
3. Drought years in southern S.A. (1902, 1914, 1928, 1929, 1936, 1940, 1944, 1957, 1959, 1961, 1965, 1969)	12	4
4. Non-drought years in southern S.A.	63	52

5. There is no correlation between drought in central Australia and the number of observations for the same year in South Australia.
6. The widespread occurrence of Black Honeyeaters in 1975 in South Australia was due to a great increase in abundance following several favourable years.

Only much more information can determine which of these conclusions, if any, is justified. Let us hope that the R.A.O.U. atlas scheme will provide some of this information.

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APPENDIX I

Chance plays a large part in the likelihood of observing a relatively uncommon species. One cannot say that a species recorded once or twice in a year is more common than in years when it is not recorded. It could easily have been overlooked in the latter years.

I have arranged the annual records in Table 5 such that the number of years with no, one, two, three, four, five and nineteen records are shown. There was a total of 56 records over 75 years, or 0.76 records per year or between seven and eight records every ten years. If the number of records each year is determined by chance then the number of years with no, one, two, three, etc. records will follow a predictable pattern (the Poisson distribution). An analogous situation is one where there are 100 boxes, ten of which contain balls. If ten boxes are opened (with no knowledge of which contain the balls) *on average* one ball will be found. In fact often no balls are found, only sometimes will one ball be found, rarely two balls and so on until very infrequently all ten balls may be found. I have arranged the numbers of years with no to five records according to the Poisson distribution, i.e. as if chance alone determines them. These can be compared with the observed numbers of years with each number of records. There are more years than predicted with no records or many records (four or more), and fewer than predicted with one, two or three records. Thus the records are *not* distributed randomly between the years. An important assumption that is made is that equal bird-watching effort is made each year (in our analogy the same number of boxes are opened each time). This was almost certainly not true in 1975 when most records were picked up from the atlas scheme. Otherwise effort probably increased gradually this century, a trend which should not greatly affect the conclusions. If all years except 1975 are considered, then theoretically there should be only one year in about 500 with four or more records. There are in fact five years in 74, far more than expected. Also these five years (1932, 1946, 1951, 1963 and 1970) were not all concentrated in the last few years when there were more observers.

TABLE 5 — Number of years with no, one, two, three, four, five and 19 records of Black Honeyeaters in South Australia. The proportion of years with each number of records which would be expected from the Poisson distribution and the numbers of years this predicts.

The actual and predicted number of years with each number of records differed significantly (probability that differences are due to chance is less than 0.1% using a chi-squared test, values for 19 records/year not used in this calculation).

Number of Records/Year	Number of Years	Years × Records	Theoretical (Poisson) Proportion of Years	Theoretical (Poisson) Number of Years
0	57	0	0.47	35.25
1	8	8	0.36	27.00
2	4	8	0.135	10.10
3	0	0	0.034	2.55
4	4	16	0.006	0.30
5	1	5	0.001	0.07
19	1	19	10^{-10}	10^{-8}
Total	75	56		