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# FIRST BREEDING RECORDS OF THE HERERO CHAT *NAMIBORNIS HERERO*, AND TAXONOMIC IMPLICATIONS

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## INTRODUCTION

Among the last bird species to be discovered in zoogeographical southern Africa was the Herero Chat described by R. M. de Schauensee in 1931 under the name *Bradornis herero*. To the present day this bird has remained little known, and a focal point of some taxonomic controversy.

In 1936 Bradfield proposed the removal of this species from *Bradornis* into the monotypic genus *Namibornis*. Since that time it has been shuttled about between the flycatchers and the chats by various authorities (e.g. Hoesch & Niethammer 1940; Mackworth-Praed & Grant 1963; McLachlan & Liversidge 1957; Roberts 1940), largely on the basis of repeated citations from very limited original sources.

The reasons for this state of affairs become apparent when one gets to know the Herero Chat. It is extremely local, rare even in its favoured habitat, and very shy normally. Furthermore, it is a very silent bird, and its normal haunts are rather inhospitable and difficult of access. As far as is presently known, it lives in the escarpment mountain chain fringing the central Namib Desert in South West Africa, from just north of the Erongo Plateau south to Naukluft. Our own acquaintance with the species began in October 1968, and during the latter part of the exceptionally rainy 1968-69 summer we were fortunate enough to obtain the first (as far as we know) breeding records for *Namibornis herero*. These records, together with our observations on the ecology and biology of *Namibornis*, are presented here and discussed as they affect questions regarding the taxonomic status and relationships of this bird.

## ECOLOGY AND BEHAVIOUR

In our experience, *Namibornis herero* occurs on and at the foot of the hillsides and mountain-slopes of the escarpment region. It shows no particular attraction to cliffs, and avoids completely bare slopes, being found mainly in mixed *Acacia-Commiphora* associations. This habitat consists typically of rather small (about 3-4 metres high) trees, rather thinly scattered over the rock-strewn slopes, and with practically no ground-cover except for short periods during wet years. The average rainfall is in the region of 75-250 mm (3-10") per annum.

We have often noted its preference for dry watercourses on the slopes, no doubt because there are more trees in such spots. *Namibornis* seems to be quite sedentary and we came to know the territories of several pairs, which could always be found therein. The only area where we found *Namibornis* to be less than rare was Groot Spitskop (Gross Spitzkopf and various other spellings also used), a remarkable granite inselberg on the edge of the Namib Desert near Usakos, quite isolated from other potential *Namibornis* habitat. Besides pairs in more typical habitat here, we found two pairs, the "West camp pair" and the "car-park pair" which lived in mixed *Acacia* veld on the plains at the base of the Spitskop. Interestingly enough, no *Namibornis* were found at Klein Spitskop, an inselberg about 8 miles west of Groot Spitskop, and much closer to it than the nearest *Namibornis* habitat to the east.

The Herero Chat spends most of its time hunting from a low perch in a bush or tree, picking food off the ground. Most food appears to consist of insects. We once observed it feeding on the berries of a small shrub, *Commiphora saxicola*, at Spitskop, and the "car-park pair" frequently visited the camp site on the east side of Groot

Spitskop to look for scraps. In these respects there appears to be a great similarity to the food preferences described by Steyn (1966) for *Cercomela familiaris*.

The behaviour and field appearance of *Namibornis* have been described by Hoesch (1938, 1955) and Hoesch & Niethammer (1940). These authors suggested that wing-flicking, dipping flight and general behaviour clearly demonstrated the chat-like affinities of this bird. We cannot entirely agree. Wing-flicking is common in *Muscicapa striata* and to a lesser extent in *Bradornis* species. Furthermore, the flight of these flycatchers is only *relatively* straighter than that of *Namibornis* and *Cercomela*. Again, while *Namibornis* does appear rather *Cercomela*-like on the ground, its general hunting behaviour more closely resembles that of *Bradornis* in the long, quiet periods of sitting on one perch. These are all rather small and nebulous points, and perhaps more strongly reflect the chat-like characteristics of the *Bradornis* flycatchers than anything else.

The calls of *Namibornis* have been inadequately described. It is rather silent except just prior to, and during, breeding. The "contact call" described in Hoesch & Niethammer (1940) and McLachlan & Liversidge (1957) is actually a rather subdued, though quite penetrating, trilled "ji ju jiu" which we have heard only in summer. It sounds remarkably similar to the two-note contact call of the Natal Robin *Cossypha natalensis*, i.e. the "call-note" mentioned by Clancey (1964) and McLachlan & Liversidge (1957) for that species. An alarm call heard only once, at Nest 1, was a long, subdued but harsh "churrrr", uttered by both parents. *Namibornis* also has a "song": a set of beautiful, mellow, warbled and trilled, jumbled, short phrases, distinctly robin-like and very similar to some of the Damara Rockjumper's *Achaetops pycnopygius* song phrases. We have on several occasions crept up to singing birds to assure ourselves as to which species was in fact responsible (the habitats of *Namibornis* and *Achaetops* show slight overlap in some parts of the escarpment region). The song of *Achaetops* is, however, considerably more developed than that of *Namibornis*. This *Namibornis* "song" is heard throughout the year, but is restricted to bursts of only one or two phrases during the non-breeding period. It seems therefore that the "song" is properly regarded as an extension of the true contact call, while the three-note call is actually a special "breeding contact call".

On 15 February 1969 a remarkable display was witnessed by one of us (M. J.). The "car-park pair" at Groot Spitskop was under observation in the early afternoon. One bird sat on a knob formed by a parasitic mistletoe *Loranthus* in a small *Acacia* tree, and made "wallowing" movements such as might occur in nest-shaping. The second bird then hopped onto the same spot while the first jumped off, and repeated the performance. The first bird thereupon assumed a posture like a begging fledgling, fluttering its wings but uttering no sound, and the second bird fed it an insect. We are unaware of any similar observations among chats or flycatchers, and consider this to have been a courtship display.

#### NEST, EGGS AND YOUNG

*a. Nests:* On 20 March 1969 we found the first nest of *Namibornis herero* in the Gamsberg Pass area, on the farm Djab. It contained a chick, and we were able to photograph the adults feeding insects to it. The nest was situated about 2 m up in the outer twigs of the lowest large limb of a 5 m tall paperbark tree, *Commiphora angolensis*, on a very steep shale hillside. It was built into a "multiple fork" of twigs and sprigs, and was a bulky but otherwise flycatcher-like cup of dry, rather chaffed, fine grass, vegetable fibres and a few rootlets and thin plant stems at the base. Crude binding or weaving was evident when the nest was pulled apart. The primary materials used for this were fine silky seed fibres and cobweb (more of the former). The nest was bound onto and crudely woven around the supporting twigs. The inside appeared to consist of fine materials of the same type, plus some animal hair. Dimensions were



Figure 1. Adult Herero Chat feeding young at Nest 1, Gamsberg Pass area 20 March 1969.

approximately: inside diameter 55 mm, greatest outside diameter 80 mm, inside depth 35 mm, outside depth 60 mm.

A second nest (deposited at Transvaal Museum, Pretoria) was found on 24 March at Groot Spitskop and belonged to the "car-park pair" whose display was noted in February (it should be mentioned that the birds were not marked; they were recognized by their territories and small behavioural differences). The nest was very similar to Nest 1 except that it was bulkier and more untidy around the bottom on the outside. It was situated on a knot of *Loranthus* in an acacia tree, but not the one on which the earlier display was witnessed. The nest was about 1.3 m up, in the parasitic clump on the outer twigs of the acacia. Besides the other materials recorded in Nest 1, there was a great deal of downy plant-seed fibre, some of it apparently manipulated by the birds into a cotton-wool-like appearance. It was used particularly in lining the cup. Chemical and microscopic tests made by the University of Stellenbosch Textiles Laboratory confirmed that the material was of plant origin, but was definitely not cotton (fibre diameter different).

A third (empty) nest was found some time after the breeding season in the territory of the "West camp pair" at Groot Spitskop. It was about 4m up in the outer twigs of an *Acacia*, and was very like Nest 1, but lined with the cotton-wool-like material found in Nest 2, and for these reasons was considered to be a *Namibornis* nest.

*b. Eggs:* Two eggs were found in Nest 2. They were a very pale greenish-white with discrete small, dark red-brown speckles scattered sparingly all over, more at the thick end. They measured 22.7 x 16.6 and 23.2 x 16.4 mm, and were nearly fresh. The parents were found incubating on two succeeding days, so it seems certain that this nest had

a complete clutch. One egg was taken for further studies, and we made certain that the parents accepted the reduced clutch. Unfortunately this nest was robbed before our next visit, and no further information could be obtained. We found no other nests with eggs.

*c. Young:* We found no unfeathered young. The nestling in Nest 1 was already quite well feathered, with remiges broken through about 20 mm. There were wisps of down here and there on the upperparts, particularly on the head. The gape was yellow and the mouth orange as in *Cercomela* and *Bradornis*; the bill was blackish. The dusky face-mask was already apparent. This nestling was discovered and observed on a particularly hot (about 34°C), humid day. Although it was in partial shade at all times, it panted rapidly when alone and made efforts to get into complete shade. One parent shaded it by crouching or standing over it for periods of 15 minutes or so between feedings during the hottest six hours of the day.

In addition to the two occupied nests, we found three sets of fledglings under parental care, all at Groot Spitskop. One was definitely a solitary chick, with the "West camp pair" whose presumed nest was subsequently found. The other records refer to one of the "Bushmen's Paradise pairs" on the Spitskop plateau. On 24 March this pair was feeding one, and possibly two, fledglings. On 10 May a pair in the same territory, and therefore almost certainly the same pair, was feeding two fledglings, recently out of the nest, judging by their flying ability. There is no indication that the post-fledging dependence could last 47 days, so it is most probable that this Bushmen's Paradise pair raised two broods in the 1969 season. Bradfield's (1936) record of a juvenile on 3 April 1933, and Hoesch & Niethammer's (1940) record of a female approaching breeding condition on 29 January 1939, are both consistent with our breeding dates (Table 1).

The juvenile *Namibornis* is mottled above in rust, dark brown and light buff. The tail is shorter and redder than in the adult. The blackish-brown face-mask is well defined as in the adult. Below, the juvenile is lightly mottled rather than streaked with blackish-brown on a whitish ground, from chin to upper belly. The rest of the underparts appear white. This is a field description. The fledgling begs with a loud, slightly trilled "tsrrp". It is very similar both in call and in appearance to the juvenile Marico Flycatcher *Bradornis mariquensis*. The latter, however, lacks the mask and red tail; is far more heavily streaked with blackish-brown below and begs with a loud, more metallic "tzeep".

#### COMPARISON WITH POSSIBLE NEAREST RELATIVES

It is instructive, in searching for the true relationships of *Namibornis herero*, to compare its biological characteristics with those of possible near relatives. A cursory glance at standard works dealing with *Namibornis* makes it clear that it shows characteristics of both chats and flycatchers, particularly of the chat genus *Cercomela* and the flycatcher genera *Bradornis* and *Muscicapa*. In the latter genus *Muscicapa striata* in particular shows some interesting "convergence" with the chats. We will consider firstly the new information on breeding.

Nothing similar to the display described earlier for *Namibornis* seems to have been recorded, at least for African chats and flycatchers. *Bradornis* and *Muscicapa* construct a cup-shaped nest; in the case of *B. mariquensis* and *B. pallidus* the nest is flimsy and placed about 2 to 6 m up in the outer twigs of trees. It is made of twigs, grass stems and similar material, being lined with softer fine grass, animal hair (*pallidus*) or feathers (*mariquensis*). *B. infuscatus*, on which we have no personal data, is said to build a large untidy nest of twigs, straw and plant stems with a deep inner cup of finer grass lined with downy plant fibres, wool, etc. This nest is placed low down in the middle of bushes usually, but may be up to 1.5 m high in a tree (A. C. Kemp, pers. comm.; Nest Record Cards at Percy FitzPatrick Institute). At least in *B. mariquensis* and *pallidus*, the nest is woven or bound onto the supporting twigs in some measure. According to Summers-Smith (1952), the Palearctic Spotted Flycatcher *Muscicapa*



*striata* nests primarily in creepers against walls (60%), with some nests in holes or crevices ( $\pm 15\%$ ) and few in tree forks ( $< 10\%$ ). South African *Muscicapa* place their rather bulky but neat and at least partly woven nests in holes and crevices (McLachlan & Liversidge 1957).

*Cercomela familiaris* and its South African congeners place their cup nest under a rock or bush, or in a crevice or hole. The nest consists of a pad of chaffed grass, fine vegetable matter, string, animal hair and similar material into which a cup is formed and sometimes lined with hair or wool. Sometimes there is a base of pebbles or twigs under and around the nest (Steyn 1966; personal records, on Nest Record Cards). There is no weaving at all.

*Namibornis* nests 1 and 2 were collected when the birds were finished with them, and were shown to several prominent field ornithologists (Messrs. R. Dean, M. B. Markus, P. le S. Milstein, T. B. Oatley, P. Steyn, W. Tarboton, and C. J. Vernon) with wide experience of South African nests. The general consensus agreed with our own opinion that the nests were predominantly flycatcher-like, although some chat-like tendencies could be argued. One of our consultants did, however, consider the nests more chat-like than flycatcher-like, and some were undecided.

The eggs of the *Bradornis* group are not very uniform, but all are pale green or greenish-white, immaculate (some *B. mariquensis*) or sparsely speckled (*mariquensis*, *infuscatus*) or heavily speckled and blotched (*pallidus*) with reddish-brown, the markings usually concentrated at the thick end, and in some *B. infuscatus* and *pallidus* eggs, with underlying slate blotches. The eggs of *B. mariquensis* and *B. pallidus* are smaller than those of *Namibornis*, but the birds themselves are also slightly smaller. Overall, our *Namibornis* eggs seem most closely to approach *B. infuscatus* eggs, being only slightly narrower (Figure 2). *B. infuscatus* is however a considerably bigger bird than *Namibornis* (cf. measurements in McLachlan & Liversidge 1957). The eggs of



Figure 2. Eggs of, left to right, *Bradornis infuscatus*, *B. mariquensis* (two of each), *Namibornis herero* (one) and *Cercomela familiaris* (two). From the collection of W. R. J. Dean.

*Muscicapa striata* in North Africa apparently resemble those of *B. mariquensis* in ground-colour, of *B. pallidus* in markings, and average smaller than either as is expected from a slightly smaller bird (Etchécopar and Hùe 1967).

*Cercomela familiaris* lays greenish-blue eggs, marked with reddish-brown or russet speckles, sometimes concentrated at the thick end and occasionally indistinct. Its congeners and related chats in southern Africa lay whitish to greenish-blue eggs which vary from immaculate to heavily spotted with various shades of red-brown (McLachlan & Liversidge 1957; Priest 1948; personal records). *C. familiaris* eggs average smaller than the *Namibornis* eggs also, and adults are about the same size or slightly smaller than *Namibornis* (McLachlan & Liversidge *op. cit.*, and pers. obs.).

The unfeathered chick of *Namibornis* remains unknown. Personal communication with M. B. Markus, who has just completed an extensive survey of natal pterylosis in South African passerines (M. Sc. thesis, 1969) established the fact that *Cercomela* and *Bradornis* have distinctly different natal down patterns from each other, and this character should prove useful in tracing the relationships of *Namibornis*.

The resemblance between feathered young of *Bradornis mariquensis* and *Namibornis herero*, including call, has already been mentioned. *Bradornis pallidus* resembles *B. mariquensis* in juvenile plumage (Clancey 1964; McLachlan & Liversidge 1957; Mackworth-Praed & Grant 1963), while juvenile *B. infuscatus* is almost an exact, but much larger, replica of juvenile *B. mariquensis*. Juvenile *Muscicapa striata* seem to be similar, if perhaps less strongly mottled above (Niethammer 1937).

The *Cercomela* chats are also mottled or spotted above and below in juvenile plumage. *C. familiaris* for example is indistinctly mottled with light buffy above, particularly on the wing-coverts, and mottled with dusky ("scaled") on throat and chest (Clancey 1964; McLachlan & Liversidge 1957; Mackworth-Praed & Grant 1963; personal data). It is much less strongly marked, above and below, than juvenile *Bradornis*. Compared to these two genera, the *Namibornis* juvenile is intermediate in intensity of markings, perhaps slightly more like *Cercomela* than *Bradornis*. The begging call of fledgling *C. familiaris* is a subdued buzz, "jzwee", quite different from the begging calls of *Namibornis* and *Bradornis*.

It is clear from the above that *Namibornis* shows no strikingly new or different features in its breeding biology. In the field it bears a strong general resemblance in form and habits to *Bradornis mariquensis* and *Cercomela familiaris*, both of which occur at least marginally within its habitat. Its nest, eggs, and young resemble those of either *Cercomela* or *Bradornis*, or both. The adult calls of *Namibornis* are less easy to fit into the puzzle. The alarm call sounds more like that of *B. mariquensis* and (judging from Mackworth-Praed & Grant 1963) *B. infuscatus* than of *Cercomela familiaris* which uses a harsh "check-check" ("cher-cher" of Steyn 1966). But the differences must be relatively slight in terms of genetic divergence. The "breeding contact call" and "song" of *Namibornis* are quite different from the calls of *Bradornis mariquensis*, *B. pallidus* and *Cercomela* species, although the former is possibly similar to an apparent breeding contact call described by Blignaut (1959) for *Bradornis infuscatus*. The *Namibornis* calls are, however, distinctly similar to vocalizations of some African *Cossypha* robins (first pointed out by Bradfield 1936), and the "song" and "contact call" greatly resemble the warbled calls of the Damara Rockjumper and the Pale-winged Starling *Onychognathus nabouroup*.

The head and chest markings of *Namibornis* vaguely suggest the robin genus *Erythropygia*, but the tail is quite different (although not unlike *Cossypha*) and *Namibornis* does not show tail-fanning and other mannerisms of *Erythropygia*. However, the tail-raising and fanning display of *E. leucophrys* (pers. obs.) is coupled with wing-flicking, clearly showing a link with *Cercomela* and *Namibornis*.

Finally, we may note the remaining evidence bearing on *Namibornis* relationships. Hoesch & Niethammer (1940) mentioned in a footnote that anatomical study of a specimen by Dr. J. Steinbacher confirmed its affinity with the chats. This study was apparently never published, and it seems best to await a re-examination of *Namibornis*

anatomy before attaching too much weight to the above conclusion. Macdonald (1957) cited a feather examination by Dr. L. Auber which supported the unique position of *Namibornis*, while suggesting slightly stronger affinities with the chats than with the warblers or flycatchers. Like the previously mentioned study, this one was never published.

Since the evidence thus far presented suggests no clear relationship, it is of value to present all the possibly relevant biological comparisons in tabular form (Table 1). The sources of the comparative data include our own records, whenever possible using those from South West Africa in particular; Nest Record Cards of the South African Ornithological Society on *Bradornis infuscatus*; personal communications with A. C. Kemp and P. Steyn; and all the references quoted thus far.

## DISCUSSION

Two points seem reasonably clear by this stage of our analysis:

(a) *Namibornis herero* is distinctly different in its biology from either the chats/robins or the flycatchers in Table 1.

(b) While (a) is true, *N. herero* does not show any radically "new" characteristics; that is to say, all its major biological characteristics are to be found in *Bradornis*, *Muscicapa*, *Cercomela* or in fairly close relatives of these genera.

It follows then that *Namibornis* is a distinct and valid genus, and that it occupies a position intermediate between the *Bradornis* flycatchers and the *Cercomela* chats in terms of biological characteristics.

The question of how to fit *Namibornis* into existing classifications is far more complex than appears at first sight, however. Current classifications reflect the confusion experienced by taxonomists when dealing with the order Passeriformes. Thus Mayr & Amadon (1951) included the thrushes, chats and flycatchers in one family, Muscicapidae, a scheme followed by Fisher & Peterson (1964) amongst others. Wetmore (1960), however, retained the chats and thrushes in the separate family Turdidae, as did Van Tyne & Berger (1959) and many regional authorities. Modern classifications attempt to reflect the phylogeny of the various organisms presently alive on earth. In some cases this is relatively easy; in birds this is so in the older orders. To comprehend the difficulties in the Passeriformes it is necessary to understand the genetic background of birds. In recent years, evidence from cytogenetic studies has been mounting to show that birds are genetically extremely conservative when compared to, for example, mammals (Yamashina 1951; Makino & Baldwin 1954; Ohno *et al.* 1964; Renzoni & Vegni-Talluri 1966; Ray-Chaudhuri *et al.* 1969; Jensen unpubl. thesis). We can do no more than touch on the subject here, but in practical terms this means that the passerines, a relatively young and blossoming group, have essentially a uniform genetic pool. This results in the same general characteristics cropping up repeatedly in different combinations. The many cases of convergent evolution in passerines bear impressive testimony to this view. Since the same genes are usually responsible for these characters in their different combinations, it becomes virtually impossible to distinguish "convergence" from "phylogenetic homology" ("affinity" of Lack 1968)—if indeed such distinction is meaningful. The case of *Namibornis* appears to be just such an example. However, in view of the completely intergrading and overlapping series of characters exhibited by *Muscicapa*, *Bradornis*, *Namibornis* and *Cercomela* plus relatives, it seems that separation of the chats and flycatchers on a family level is not acceptable. *Bradornis* itself has of course long been regarded as a rather chat-like group of flycatchers. The additional information on *Namibornis* presented in this paper merely strengthens the evidence.

By embracing *Bradornis*, *Namibornis* and *Cercomela* in the Muscicapidae we do not of course solve the problem of relationships. Is *Namibornis* a chat-like flycatcher or a flycatcher-like chat? In terms of the above arguments, it seems futile to search for ancestral phylogenetic similarities in the absence of fossil evidence. However the degree

TABLE 1

COMPARISON OF VARIOUS BIOLOGICAL CHARACTERISTICS OF *NAMIBORNIS* AND ITS PROBABLE CLOSEST RELATIVES

	<i>Muscicapa striata</i>	<i>Bradornis</i> sp.	<i>Namibornis herero</i>	<i>Cercomela familiaris</i>	<i>Erythropygia leucophrys</i>
Habits	Arboreal; hawks insects; flicks much; flight dips some.	Arboreal-terrestrial; feeds on ground; eats insects; flicks some; flight $\pm$ straight.	Arboreal-terrestrial; feeds on ground; eats insects, berries, scraps; flicks much; flight dips.	Less arboreal, more terrestrial; feeds on ground; eats insects, berries, scraps; flicks much; flight dips.	Arboreal-terrestrial; feeds on ground; eats insects; wing-flick part of tail-raising display; flight dips.
Adult Calls	Simple; weak sibilant song; alarm: "tek-tek".	Simple; weak sibilant song; alarm: "churrr" (one or more); "irrioo" call ( <i>infuscatus</i> ).	Fairly complex warbled or trilled phrases <i>Cos-sypha</i> -like; alarm: "churrrr" (soft, single); "ji ju jiu" calls	Simple; creaky song; alarm: "check-check" (harsh, one or more).	Fairly simple, whistled; alarm: a churr.
Egg Dates	N.A.	Dec.-Apr. ( <i>mariquensis</i> in S.W.A.); Nov.-Mar. ( <i>infuscatus</i> in S.W.A. & N. Cape.)	Feb.-Apr. (1969).	Sept.-Mar. (S.W.A.).	Oct.-Dec. (South Africa). Jan.-Feb. (S.W.A.)
Nest Site	In creepers, trees; sometimes holes, crevices; above 1 m.	In outer twigs ( <i>pallidus</i> , <i>mariquensis</i> ) or in middle of bush ( <i>infuscatus</i> ); above, or below ( <i>infuscatus</i> ) 1 m.	In outer twigs; above 1 m.	In hole, crevice or under stone; usually below 1m.	In crevice, or more often under grass tuft or other plant, below 1 m.
Nest	Part-woven cup, fairly loose construction (chat-like?); rootlets, twigs, moss, lichen; lined with wool, hair, sometimes feathers, cloth.	Part-woven grass cup lined with feathers ( <i>mariquensis</i> ) or wool, plant down, etc.	Rather bulky part-woven grass cup lined with plant down, etc.	Bulky but unwoven, "formed" cup of chaffed grass, string, hair, etc.	Part-woven bulky grass cup, lined with fine grass and rootlets.
Clutch	3-4 (N. Africa)	2-3, 4	1-2.	2-3, few 4	2-3
Inc.-Fledg.	13-14/13-14	?/14-15 ( <i>mariquensis</i> )	?/?	14/15	$\pm$ 15/15
Eggs	Buff- or greenish-grey, richly spotted sienna; 19 $\times$ 14 (N. Africa).	Pale greenish to whitish, plain to heavily speckled red-brown; 19.9 $\times$ 14.4 ( <i>mariquensis</i> ); 23.0 $\times$ 17.1 ( <i>infuscatus</i> ).	Pale greenish-white with small red-brown speckles; 23.0 $\times$ 16.5 (2 only).	Bright bluish-green with fine reddish-brown speckling (sometimes faint); 20.6 $\times$ 15.2.	White, well spotted with brown and underlying ash. 19.9 $\times$ 14.4.
Feathered Young	Mottled above and below.	Strongly mottled above, heavily streaked or mottled below.	Mottled above and below.	Lightly mottled above and below.	Heavily mottled above and below.
Young Call	"psihp".	Metallic "tzeep".	Less metallic trilled "tsrrp".	Buzzing "jzwee".	Sibilant "seet."



of genetic homology, as estimated by observable characters, may shed some light on such problems, even though the distinction between phylogenetic homology and convergence cannot be made. Figure 3 shows the characters of *Namibornis* described in Table 1 in terms of the likely direction of genetic homology.

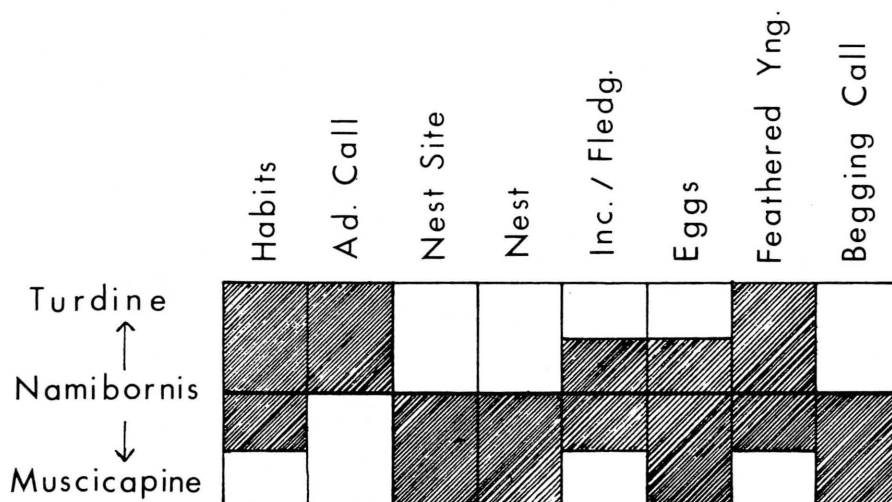


Figure 3. Probable genetic homologies of some *Namibornis* biological characteristics.

Egg-dates, clutch size and food, being greatly environment-dependent, cannot provide useful genetic information and have been omitted. Incubation and nestling periods are unlikely to differ much in *Namibornis* from those of *Bradornis*, *Muscicapa* and *Cercomela*, in all of which they are essentially the same. Three characters seem to show clearly muscipine affinities, one is clearly turdine, one tends towards the flycatchers and two tend to be more turdine than muscipine. The degree of genetic complexity (i.e. the number of genes involved) is not, however, the same in all of these characters. One can attempt to refine the analysis by making a broad division into "relatively complex" and "relatively simple" characters. The actual numbers of genes involved are of course unknown. The characters may be assigned arbitrary values according to the following scale of units:

Complex, pronounced or complete tendency	100
Complex, partial (slight) tendency	50
Simple, pronounced or complete tendency	50
Simple, partial (slight) tendency	25

Under this treatment the characters in Figure 3 resolve themselves as follows:

Habits	complex, slightly more turdine	50 chat
Ad. Call	complex, turdine	100 chat
Nest Site	simple, muscipine	50 flycatcher
Nest	complex, muscipine	100 flycatcher
Inc.-Fledg.	complex, neutral	0
Eggs	simple, slightly more muscipine	25 flycatcher
Feath. Yng.	complex, slightly more turdine	50 chat
Begging Call	simple, muscipine	50 flycatcher

This table gives total scores of: 200 chat; 225 flycatcher

Even with this analysis it is difficult to pin down the true affinities of *Namibornis*. We hesitate to make any recommendations on such a tenuous basis. It seems, however, that on present evidence the closest South African relatives of *Namibornis* are flycatchers of the *Bradornis* group. *Namibornis* is therefore seemingly best placed either with *Bradornis* in the Muscipinae or in a separate subfamily between the Muscipinae and the Turdinae. We are unable to suggest any other groups or species with which *Namibornis* may have closer affinities. Our findings are best explained by assigning *Namibornis* to a position on the flycatcher branch of the phylogenetic tree, close to its point of divergence from the chat/thrush branch. A possible evolutionary sequence is shown in Figure 4.

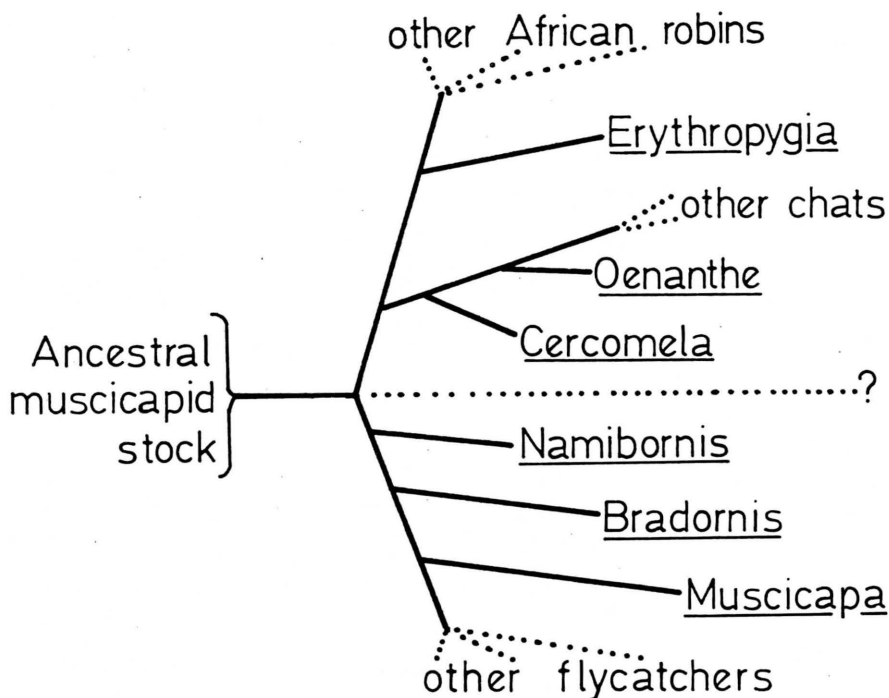


Figure 4. The evolutionary tree: a possible branching sequence involving the chats/thrushes and the flycatchers.

The main branches have been represented as diverging simultaneously from the ancestral stock because this seems best to fit our evidence. This is contrary to accepted practice where the thrushes are commonly considered to be older than the flycatchers (e.g. Van Tyne & Berger 1959; Wetmore 1960) or *vice versa* (Mayr & Amadon 1951; Fisher & Peterson 1964). Slight shifts in the time of divergence would not affect our arguments.

The position of *Muscicapa* in Figure 4 may appear surprising to some. It is perhaps unfortunate for systematists that *Muscicapa* should be the type genus of the Muscipinae.

#### SUMMARY AND CONCLUSIONS

The nest, eggs and feathered young of *Namibornis herero* are described for the first time, and new information on its habits, habitat and calls presented. These

characters are compared with those of the possible closest relatives occurring in southern Africa, the genera *Bradornis*, *Muscicapa* and *Cercomela*. We conclude that, in terms of biological characteristics:

1. *Namibornis* is a well-defined, valid genus.
2. It occupies a position exactly intermediate between *Cercomela* (chats) and *Bradornis* (flycatchers).
3. On present evidence *Namibornis* seems to be slightly closer to *Bradornis* than to *Cercomela*, particularly in view of its predominantly flycatcher type of nest. It should therefore be placed either with *Bradornis* among the flycatchers, or in a separate taxon between the chats and the flycatchers.
4. Separation of chats and flycatchers at the family level is unrealistic.
5. *Namibornis* seems to be best regarded as being close to the point of divergence of the flycatcher stock from the chat stock, i.e. as a relatively primitive flycatcher.

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