REVISION OF THE CHRYSOCHLORIDAE

I. THE DESERT GOLDEN MOLE *EREMITALPA* ROBERTS

By JURGENS MEESTER

Kaffrarian Museum, King William's Town.

(With 1 figure and 2 plates).

The genus *Eremitalpa* was created by Roberts (1924) to include the species *Chrysochloris granti* Broom, 1907, from Garies, Little Namaqualand. The subspecies *E. granti cana* Broom, 1950, was described from Lamberts Bay, and in 1959 *E. granti namibensis* Bauer and Niethammer was based on a long series of skull fragments from owl pellets collected at Sossus-Vlei in the Namib desert. The purpose of the present paper is to review the relationships of these three subspecies, and particularly to consider the possibility, suggested by Bauer and Niethammer (1959), that *namibensis* might be a synonym of *Chrysochloris damarensis* Ogilby (1838), which has not again been collected since the time of its original description.

Material used in this study consists of a long series of skins and skulls of *E. g. granti* from Port Nolloth; the type (KM 1182, ♀, 20.I.1938) and five topotypes of *E. g. cana* from Lamberts Bay; skull remains of *E. g. namibensis* collected in the Namib desert at Sossus-Vlei (ie. paratypical) and Natab (see Meester, 1962) and four skins and skulls of this subspecies collected during late 1963 at the Desert Research Station at Gobabeb in the Namib desert.

Eremitalpa is a small greyish-yellow animal with sides, abdomen and legs yellowish or pale fawn in colour. Overall length is roughly 70-85 mm. Forefeet have the first claw relatively well-developed and only slightly shorter than the second, while the fourth claw is short but broad and nail-like. The skull is short (± 16.5 — 20.5 mm.) and broad (± 15.0 — 18.5 mm.), with the ratio of width/ length ± 80 — 95% in available material. The tooth formula is:

$$I\ \frac{3}{3} : C\ \frac{1}{1} : P\ \frac{3}{3} : M\ \frac{3}{3} = 40$$

It differs from all the other golden moles in possessing a relatively well-developed nail-like fourth claw on the forefoot. It also differs from all, except *Cryptochloris*, in colour and in having the first claw of the forefoot nearly as long as the second (although *Amblysomus obtusirostris* also has a moderately well-developed first claw). *Cryptochloris* (which bears a most striking superficial resemblance to *Eremitalpa*) and *Chrysochloris* differ further in possessing a temporal bulla. *Amblysomus* and *Chrysospalax* are larger, with colour darker, usually brown or blackish-brown and skull relatively much narrower.

Eremitalpa granti granti (Broom, 1907).

Larger, greatest skull length 18.6 — 20.4 mm., M = 19.5 mm. in available material (Table I); skull proportionally narrower, greatest width 15.5 — 18.2 mm., M = 16.7 mm., and ratio greatest width x 100/ greatest length varying from 79.9 — 89.7%, M = 85.5'% in available material. Hair longer, about 8 — 13 mm. at mid-back.

The stated differences between *E. g. granti* and *E. g. cana* (colour, degree of development of the first foreclaw, dimensions of P^1 and M^3, appea-

rance of lower premolars, and size and shape of the malleus — Broom, 1950) do not hold good when individual variation is taken into account. As will appear from Table I, specimens of *cana* from Lamberts Bay have a slightly larger skull on the average (mean greatest length = 20.1 ± 0.180 mm.; greatest width = 17.2 ± 0.161 mm.) than *granti* from Port Nolloth (G.L. = 19.5′ ± 0.079; G.W. = 16.6 ± 0.077). These differences are statistically significant at the 1% level (G.L.: t = 3.047, 48 degrees of freedom, $P < 0.01$; G.W.: t = 3.367, 48 degrees of freedom, $P < 0.01$), but below the conventional level of subspecies recognition (90% joint non-overlap — Mayr, Linsley and Usinger, 1953); in the case of greatest length there is less than 75% joint non-overlap, while in greatest width there is between 75 and 80%.

The fur is slightly longer on the whole in *cana* (11 — 13 mm., M = 12.1 mm. at mid-back) than in *granti* (8 — 13 mm., M = 10.3 mm.), but this difference is too slight to justify subspecies separation, particularly in view of the seasonal variability of hair length, and the difficulty of measuring this feature accurately.

In view of these considerations it appears unjustified to uphold the subspecific validity of *cana*, and this form is consequently regarded as a synonym of *granti*.

The inclusion of *cana* extends the known range of *granti* to include the western Cape Province from Lamberts Bay in the south to Port Nolloth in the north. Shortridge (1942) expresses the opinion that *Eremitalpa* (and therefore presumably this form) may extend as far south as the Berg River mouth.

Eremitalpa granti namibensis Bauer and Niethammer, 1959.

Smaller, greatest skull length 16.8 — 19.4 mm., M = 18.1 mm., in available material (Table I); skull proportionately broader, greatest width 15.1 — 18.5 mm., M = 16.7 mm., and ratio of greatest width x 100/ greatest length varying from 85.3 — 95.7%, M = 92.6%, in available material. Fur shorter, about 6.5 — 7.0 mm., M = 6.9 mm. at midback.

When greatest skull length is compared with that of *granti* (Table II), percentage joint non-overlap exceeds 90% (ie. the conventional level of subspecific distinctness) in all cases except when *granti* from Port Nolloth is compared with *namibensis* from Natab and Gobabeb. In relative skull width (G.W. x 100 / G.L.) on the other hand (Table III), Natab and Gobabeb specimens show more than 96% joint non-overlap when compared with both Lamberts Bay and Port Nolloth *granti*. When G.W. x 100 / G.L. is plotted against greatest length (figure 1), *granti* and *namibensis* are clearly separated.

Hair length in available material of *namibensis* (6.5 — 7 mm., M = 6.9 mm. at midback) shows no overlap with that of *granti* (8 — 13 mm., M = 10.3 mm.).

In view of these considerations there can be little question that the subspecific separation of *namibensis* is justified.

Originally known only from owl pellet specimens from the type locality at Sossus-Vlei, and also Natab (Meester, 1962), the range is now known to include also Gobabeb, where complete specimens, comprising both skin and skull, were collected near the Desert Research Station during October — December, 1963.

Specimens from Sossus-Vlei have a proportionately narrower skull than those from Natab and Gobabeb (Table I) and this difference is statistically significant at the 5% level (t = 2.37, 11 degrees of freedom, $P<0.05$). Greatest skull length and greatest width do not differ significantly.

In their description of *namibensis* Bauer and Niethammer (1959) speculate as to the possibility that this form might be the same as *Chysochloris damarensis* Ogilby (1838). The latter species, described originally from Damaraland, with no more detailed indication of type locality, has not since then been collected again. Ellerman *et al* (1953) regard it as a subspecies of *Chrysochloris asiatica*.

The original description of *damarensis* deals only with external appearance, and is not very detailed (brown with a silvery lustre above and below;

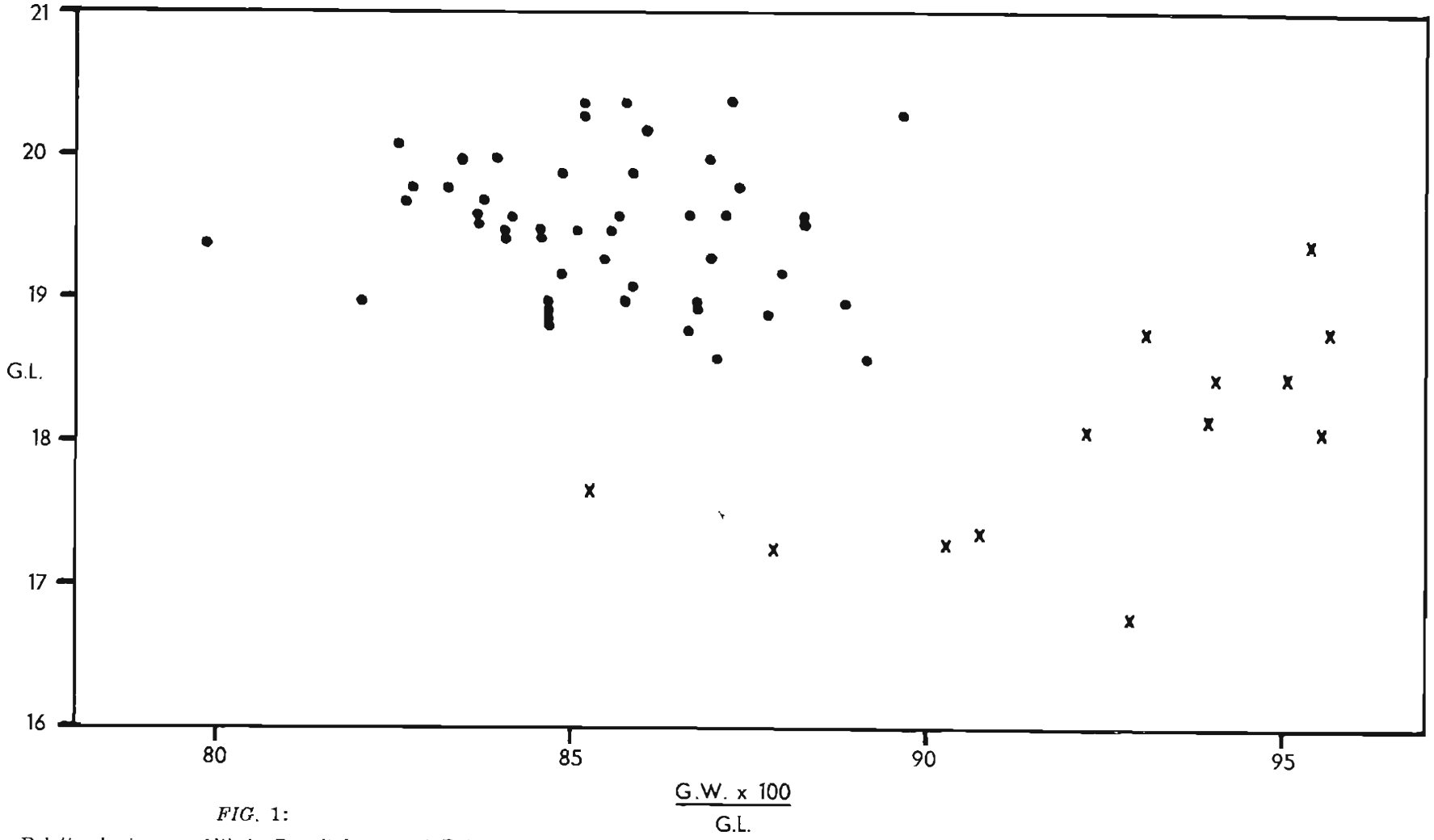

FIG. 1:

Relative braincase width in *Eremitalpa granti*. Dots — *E. g. granti* (including *E. g. cana*); crosses — *E. g. namibensis*. G. L. — greatest skull length; G. W. — greatest width.

length 4½ in. — Ogilby, 1838). As the external appearance of *namibensis* was unknown at the time of its description there was room for speculation as to whether or not it was the same as *damarensis,* and Bauer and Niethammer tentatively concluded that this might indeed be the case. However, now that external appearance is known, thanks to the material from Gobabeb, it becomes clear that it differs markedly from *damarensis.* Firstly, colour is yellowish-grey above, yellowish or pale fawn below, and not silvery brown above and below as in *damarensis;* secondly, size is much smaller, varying from 72 — 81 mm. in four specimens, as against 4½ inches (ie. 114 mm.) in *damarensis.* It does not therefore appear justifiable to regard *namibensis* as being closely related to the Damara form.

BIOLOGICAL

Eremitalpa appears to be restricted to the soft, shifting sands of the western Cape coastal regions and the Namib desert of South West Africa, being absent further inland where the sandveld is more firm (Shortridge, 1942). Both Shortridge and Roberts (1951) refer to its extensive use of shallow tunnels just below the surface of the sand, as well as deeper tunnels further down in more solid sand. In this it resembles other golden moles, eg. *Amblysomus hottentotus.* However, no mounds are thrown up, although Shortridge mentions openings where excavations occur.

The first two complete specimens of *namibensis* to be collected (TM 14048, unsexed; TM 14049, ♀: 9/X/1963, Gobabeb), were found in sand-dunes after a windstorm had smoothed the surface, so that the ridges formed by their movement just below the surface were clearly visible and easy to follow (W. D. Haacke and O. P. M. Prozesky, *in litt.).*

One of these specimens was kept alive for some weeks, during which time it was observed in captivity. For the most part it remained below the surface of the loose sand in which it was kept, going down to a depth of about 3 — 4 inches when resting, but burrowing just below the surface when active and exploring its cage. It appeared to prefer slightly damp sand in which burrows persisted for some time. However, it showed no sign of discomfort when burrowing or at rest in loose sand, which immediately filled in any cavity made by it in moving about, so that the construction of tunnels was impossible, and the mole was in effect buried all the time in loose, shifting sand.

Roberts (1951) records legless lizards (*Typhlosaurus vermis*) in the stomach contents of *granti* and Shortridge (1942) describes its food as consisting of "various sand-burrowing species of anguine skinks".

The captive specimen of *namibensis* was fed on mealworm larvae, which it ate readily, although not in large quantities, supplemented with occasional cutworm larvae. Although active at intervals throughout the day and night, the main period of activity appeared to be at midday, when it frequently came to the surface. Roberts (*loc. cit.*) points out that *granti* is also active at midday, and accounts for this by pointing out that the legless lizards that this animal preys upon are hiding in the leaf-mold under bushes at that time.

Senses appear to be poorly developed. Sight is of course entirely lacking, although a vestigial, non-functional eye remains. Hearing and smell do not seem to be very acute, and touch also does not appear to be as highly developed as, for instance, in the rodent mole *Cryptomys hottentotus.* Nevertheless, touch appears to be the sense on which *Eremitalpa* mainly depends in finding food and avoiding capture.

Enemies include the barn owl, *Tyto alba* and, according to Shortridge (1942), probably other "four-footed and winged carnivores".

ACKNOWLEDGEMENTS

Sincere thanks are herewith tendered to the Director and staff of the Transvaal Museum, Pretoria, for the loan of the material here discussed. Particular thanks are due to Messrs. W. D. Haacke and O. P. M. Prozesky, who captured the first Gobabeb specimens, and who provided useful field notes on these; Mr. Haacke further took the photographs used to illustrate this paper.

LITERATURE CITED

BAUER, KURT & NIETHAMMER, JOCHEN. 1959 Über eine kleine Säugetierausbeute aus Südwest-Afrika, *Bonn. zool. Beitr., 10:* 236-261.

BROOM, R. 1950. Some further advances in our knowledge of the Cape golden moles. *Ann. Transv. Mus., 21:* 234 241.

ELLERMAN, J. R., MORRISON-SCOTT, T. C. S. AND HAYMAN, R. W. 1953. *Southern African mammals 1758 to 1951: a reclassification.* London, Trustees, British Museum. 363 pp.

MAYR, E., LINSLEY, E. G. & USINGER, R. L. 1953. *Methods and principles of systematic zoology.* New York, McGraw-Hill. 328 pp.

MEESTER, J. 1962. Some mammals from the Namib desert. *Ann. Transv. Mus., 24:* 241-248.

OGILBY, W. 1838. On a collection of mammalia procured by Captain Alexander during his journey into the country of the Damaras, on the south-west coast of Africa. *Proc. Zool. Soc. London,* 1838: 5-6.

ROBERTS, AUSTIN. 1951. *The mammals of South Africa.* Johannesburg, Trustees, 'The mammals of South Africa' book fund. 700 pp.

SHORTRIDGE, G. C. 1942. Field notes on the first and second expeditions of the Cape Museums' mammal survey of the Cape Province; and descriptions of some new subgenera and subspecies. *Ann. S. Afr. Mus., 36:* 27-100.

TABLE I

	Greatest length (mm.)	Greatest width (mm.)	$\frac{G.\ W.\ \times\ 100}{G.L.}$ (%)
E. g. granti			
Lamberts Bay	19.6 — 20.4	16.7 — 17.4	83.5 — 88.3
N = 4	M = 20.1 ± 0.180	M = 17.2 ± 0.161	M = 85.6 ± 1.00
	S.D. = 0.361	S.D. = 0.321	S.D. = 2.00
Port Nolloth	18.6 — 20.4	15.5 — 18.2	79.9 — 89.7
N = 46	M = 19.5′ ± 0.079	M = 16.6 ± 0.077	M = 85.5′ ± 0.360
	S.D. = 0.538	S.D. = 0.524	S.D. = 2.44
E. g. namibensis			
Sossus-Vlei	16.8 — 18.8	15.1 — 17.5	85.3 — 94.1
N = 8	M = 17.9 ± 0.237	M = 16.3 ± 0.350	M = 91.3 ± 1.116
	S.D. = 0.670	S.D. = 0.989	S.D. = 3.16
Natab and Gobabeb	17.3 — 19.4	15.8 — 18.5	91.3 — 95.7
N = 5	M = 18.4 ± 0.351	M = 17.4 ± 0.457	M = 94.6 ± 0.836
	S.D. = 0.786	S.D. = 1.021	S.D. = 1.87

Greatest length, greatest width and ratio of length to width in skulls of *Eremitalpa granti*. M — arithmetic mean; S. D. — standard deviation; N — number of observations.

TABLE II

namibensis

granti	Sossus-Vlei M = 17.9 mm. S.D. = 0.670	Natab & Gobabeb M = 18.4 mm. S.D. = 0.786
Lamberts Bay M = 20.1 mm. S.D. = 0.361	C.D. = 2.14 > 96% J.N.O.	C.D. = 1.48 93% J.N.O.
Port Nolloth M = 19.5' S.D. = 0.538	C.D. = 1.33 ± 91% J.N.O.	C.D. = 0.83 ± 80% J.N.O.

Comparison of greatest length in *Eremitalpa granti granti* and *E. g. namibensis*. C. D. — coëfficient of difference; % J.N.O. — percentage joint non-overlap. Other abbreviations as in Table I.

TABLE III

namibensis

granti	Sossus-Vlei M = 91.3% S.D. = 3.16	Natab & Gobabeb M = 94.6% S.D. = 1.87
Lamberts Bay M = 85.6% S.D. = 2.00	C.D. = 1.11 86 — 87% J.N.O.	C.D. = 2.32 > 96% J.N.O.
Port Nolloth M = 85.5'% S.D. = 2.44	C.D. = 1.04 85% J.N.O.	C.D. = 2.11 > 96% J.N.O.

Comparison of relative skull width $\left(\frac{\text{G.W. x 100}}{\text{G.L.}}\right)$ in *Eremitalpa granti granti* and *E. g. namibensis*. Abbreviations as in Table I and II.

PLATE 1:

a. Lateral view of *Eremitalpa granti namibensis.*

b. Ventral view of *E. g. namibensis.*

PLATE 2:

a. Close-up view of forefoot of *E. g. namibensis*.

b. Progression of *E. g. namibensis* above ground.