

The distribution and ecology of the brown hyaena *Hyaena brunnea* and spotted hyaena *Crocuta crocuta* in the central Namib Desert

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1 INTRODUCTION

The niche occupied by the hyaenas as scavengers and/or predators has for the past two decades been the subject of much research (Eloff, 1964, 1975; Kruuk, 1972; Skinner, 1976; Bearder, 1977; Mills, 1978; Skinner & Ilani, 1980; Tilson, von Blottnitz & Henschel, 1980). This has resulted in the hypothesis that as a result of differing social systems the brown hyaena, *Hyaena brunnea* and striped hyaena, *Hyaena hyaena* are effective scavengers but ineffective hunters (Kruuk, 1976; Mills, 1978a; Skinner, 1976; Skinner & Ilani, 1980); whereas the spotted hyaena *Crocuta crocuta* is an efficient hunter, particularly under circumstances such as those pertaining for example in the Ngorogoro crater (Kruuk, 1970). More recently Tilson and his co-workers (Henschel, Tilson & von Blottnitz, 1979; Tilson *et al* 1980) have examined the diet of spotted hyaenas in the Namib Desert. During surveys conducted in January 1976 and 1979 into the status of the brown hyaena in the Namib Desert information was collected on their distribution, diet and habits and compared with those of spotted hyaenas. The object of the present paper is to present this information which may lead to a better understanding of the degree of separation between the two species.

2 AREA SURVEYED AND METHODS

During 1976 a survey was made of the area from the Kuiseb River to Cape Cross and in 1979 from Wolf's Bay - Elizabeth Bay (26°52'S, 15°10'E) to Koichab Pan (26°19'S, 15°36'E). Additional information was provided by the Division of Sea Fisheries and Consolidated Diamond Mines for the coastal area between the Orange River and Wolf's Bay and for the dunes between Koichab Pan and Sossus Vlei by a member of the Department of Entomology, University of Pretoria. The presence of hyaenas was established by sightings, presence of latrines or occasionally faeces and other evidence such as fresh spoor and carcass remains.

The diet of the two species was established through faecal analysis following Kcogh (1979). Both species

ABSTRACT

Hyaena brunnea are found mainly along the coast while *Crocuta crocuta* range further inland being associated with *Oryx gazella* and freshwater. Differences in latrines are described and the scats of *H. brunnea* are significantly lighter than those of *Crocuta* (45.8 cf. 160.9; $P < 0.001$). Analysis of identifiable prey remains showed that in *H. brunnea* scats *Arctocephalus pussilus* hair predominated (75%) cf. *Crocuta* scats in which *Oryx gazella* hair (94.5%) predominated. Reasons for the geographical separation of the species are discussed.

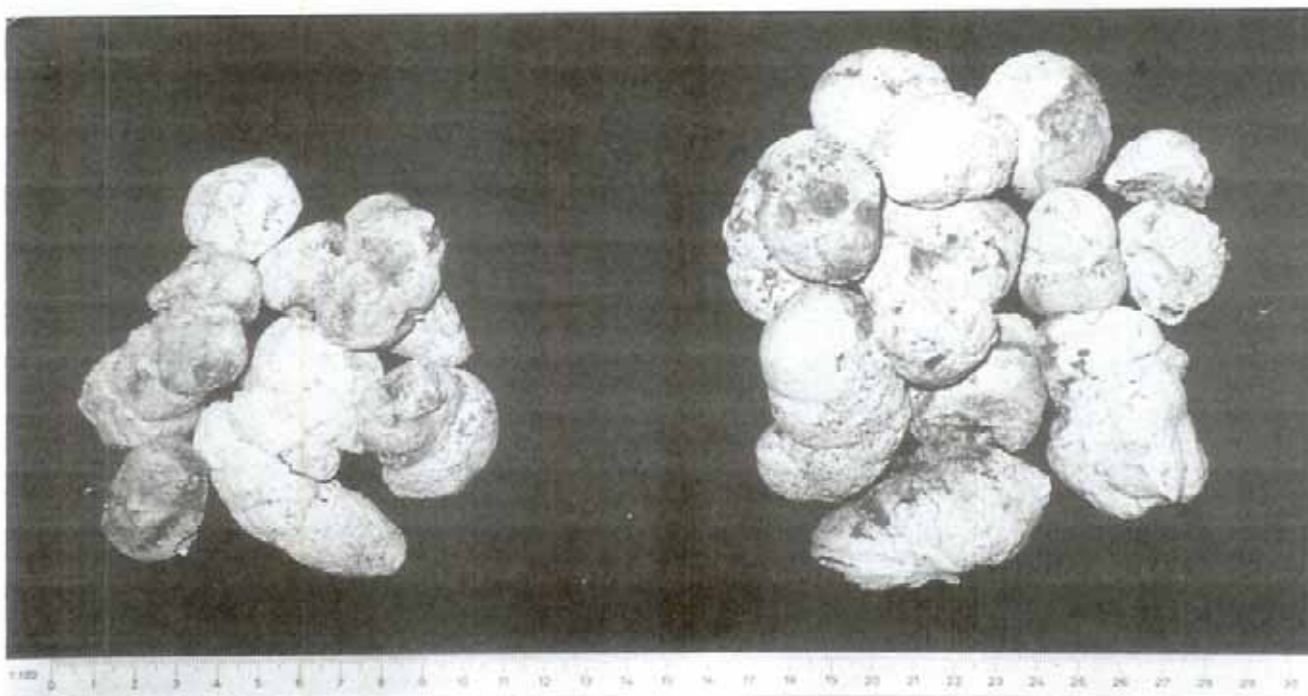


PLATE 1: Scats from *Hyena brunnea* (left) and *Crocuta crocuta*. Note the latter are very much larger.

make distinctive faecal pellets which are easily identified (Plate 1). A total of 68 brown hyaena scats from Wolf's Bay and 36 spotted hyaena scats from the Koichab Pan area was collected. In addition to analysis of prey remains the scats were analysed for calcium content as described by Nel (1967). This test was followed up through the analysis of the calcium content of the faeces of two captive brown hyaenas fed over seven days with a diet of known calcium content. Further observations were made on latrines of the two species and on prey remains left in the veld.

3 RESULTS

The distribution of both species throughout the Namib Desert is illustrated in Fig. 1. It is apparent that there is little overlap between the species, brown hyaenas being largely confined to the extreme south and coastal regions whereas spotted hyaenas are found further inland where there are more naturally protected habitats. Brown hyaenas are closely associated with seal (*Arctocephalus pusillus*) colonies at Black Rock and Wolf's Bay which are separated by some 45 km. There is little reason to doubt that a similar association exists for all the seal colonies along this coast particularly as brown hyaena spoor were also noted at Cape Cross, but there were probably only one or two individuals in attendance whereas at Wolf's Bay there was a large occupied warren in addition to visiting hyaenas from further

afield. At Wolf's Bay we also had to vacate the area before sunset as a security measure so we were unable to make any attempt at counting hyaenas; in the municipal coastal belt surrounding Lüderitz (26°39'S, 15°9'E) following evidence of hyaena spoor on the beach and reports of three hyaenas seen one night near a beach cottage and of one hyaena later being shot near the jail, we did make lengthy nocturnal searches. On one occasion we observed a brown hyaena on the beach through a Scotos I night telescope; this individual was loping along being worried by three jackals which seemed to be having a game with it. Some three kilometres further along the beach we observed another brown hyaena.

It would appear that in this area, at least, brown hyaenas are beachcombers and the name "strandjuit" originally accorded them by the first settlers in the Cape Province truly applies. The association with the seal colonies is an obvious one for any scavenger; moreover, there is a high density of jackals in the vicinity of such colonies as well as a few large feral dogs, all of which are at least scavenging on the large percentage of seal pups which die apparently from drowning when falling into the sea at too young an age. In addition, a large number of seal bulls are culled annually and it is well known that boat fishermen on the west coast destroy seals caught in the trawl nets. There is also the meat from pups culled for pelt production. A vast quantity of seal meat is therefore available for exploitation which is a big attraction for the brown hyaenas, large numbers of jackals and occasionally feral dogs.

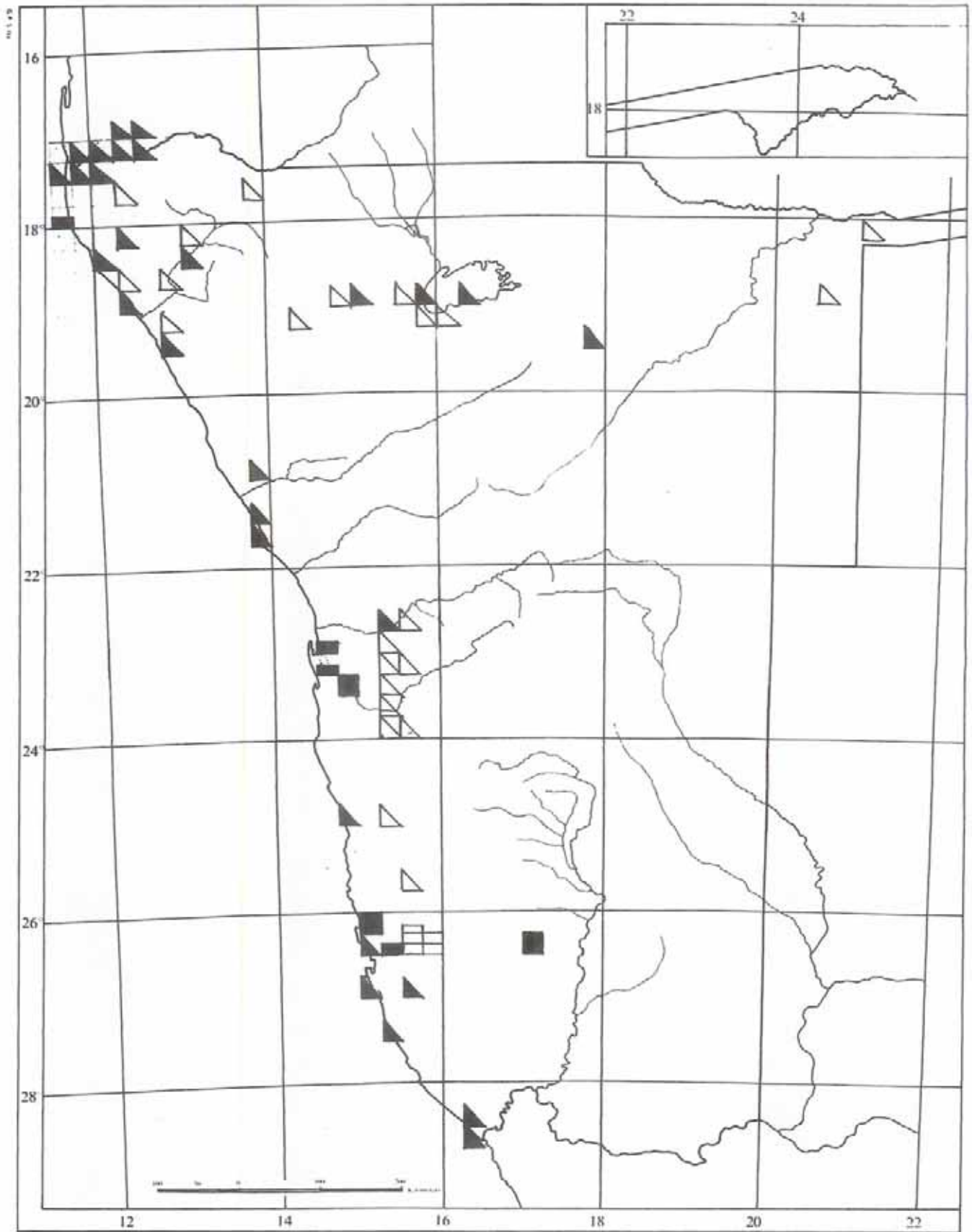


FIGURE 1: Distribution of hyaenas in South West Africa *Hyaena brunnea* ■ specimen ▴ sight record ▲ tracks *Crocuta crocuta*.

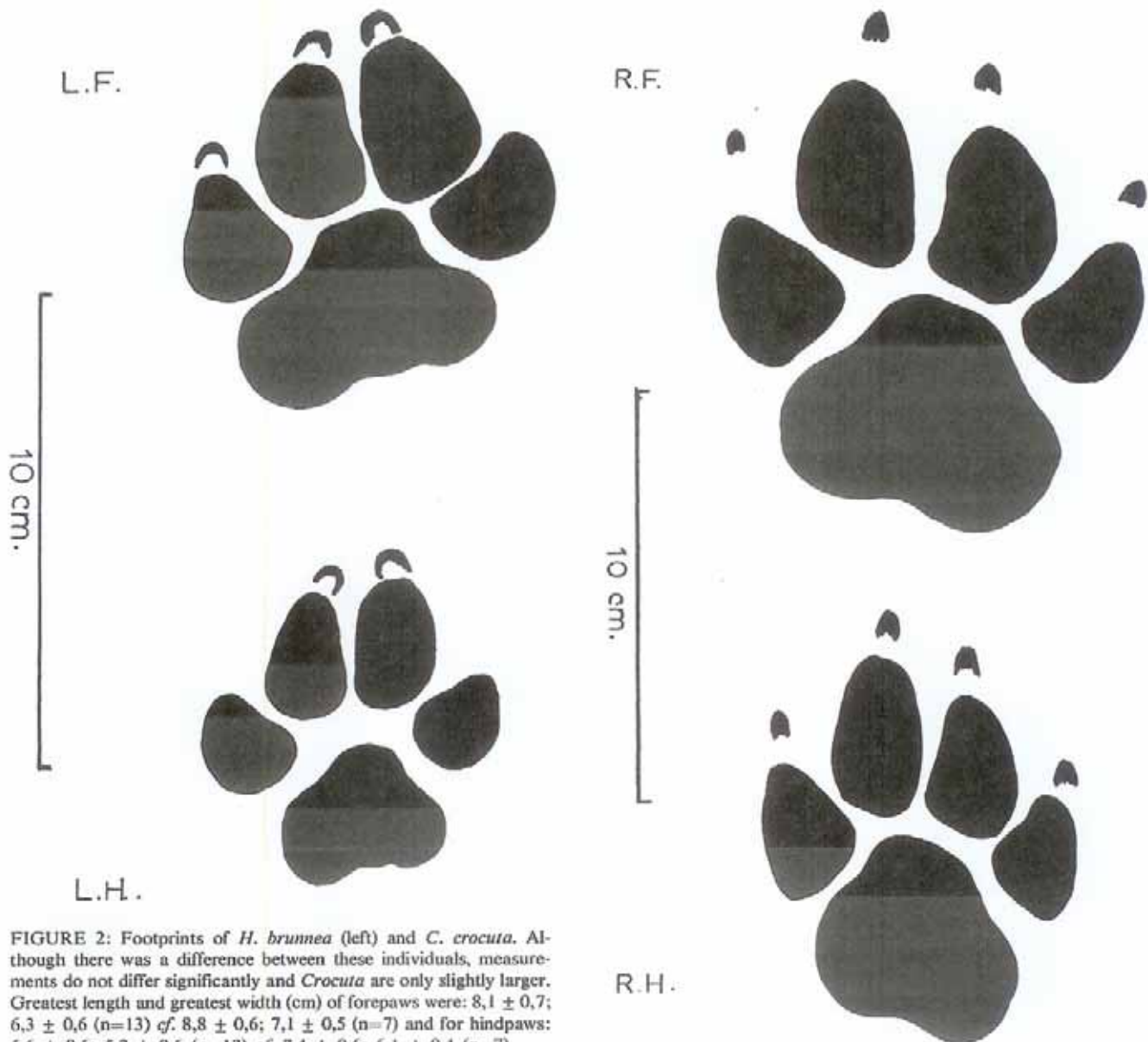


FIGURE 2: Footprints of *H. brunnea* (left) and *C. crocuta*. Although there was a difference between these individuals, measurements do not differ significantly and *Crocuta* are only slightly larger. Greatest length and greatest width (cm) of forepaws were: $8,1 \pm 0,7$; $6,3 \pm 0,6$ ($n=13$) cf. $8,8 \pm 0,6$; $7,1 \pm 0,5$ ($n=7$) and for hindpaws: $6,6 \pm 0,6$; $5,2 \pm 0,6$ ($n=13$) cf. $7,4 \pm 0,6$; $6,1 \pm 0,4$ ($n=7$).

There are several distinguishing features, apart from morphological and size differences, between *H. brunnea* and *Crocuta*. First there are small but important differences in size and shape of spoor. These are illustrated in Fig. 2.

Both species utilise latrines, but while those of *H. brunnea* are small, clearly demarcated (Plate 2) and possibly only used by single individuals, those of *Crocuta* cover an area of the order of 100 m^2 ($n=3$) over which faecal stools are deposited by members of a clan (or individuals) and there is no clear demarcated boundary. Moreover, the number of stools per latrine is far less for *H. brunnea* $5,0$ ($n=10$) cf. $12,4$ ($n=5$) than for *Crocuta*.

There is also a significant difference ($p < 0,001$) in the size of individual stools (Plate 1) between the two species, those of *H. brunnea* having an individual mass

of $45,78 \pm 4,15$ ($n=33$) cf. $160,92 \pm 21,65$ g ($n=36$) for *Crocuta*. Part of the reason for the lighter mass of *H. brunnea* scats was the large percentage of hair contained in them whereas *Crocuta* scats contained much less hair. This could be related to possible behavioural and/or digestive differences; for example, a feature of *Crocuta* is that they frequently regurgitate oral casts (Bearder, 1977) whereas oral casts from *H. brunnea* have only rarely been found.

The analysis of the identifiable contents of the scats from *H. brunnea* and *Crocuta* is presented in Table 1. It is apparent that, despite the availability of an unlimited supply of dead (and living?) seals from the seal colony (Plate 3) at Wolf's Bay *H. brunnea* has a more catholic diet than *Crocuta*. This is, however, not reflected in the calcium content of the scats which is of the same order for both species (Table 1).

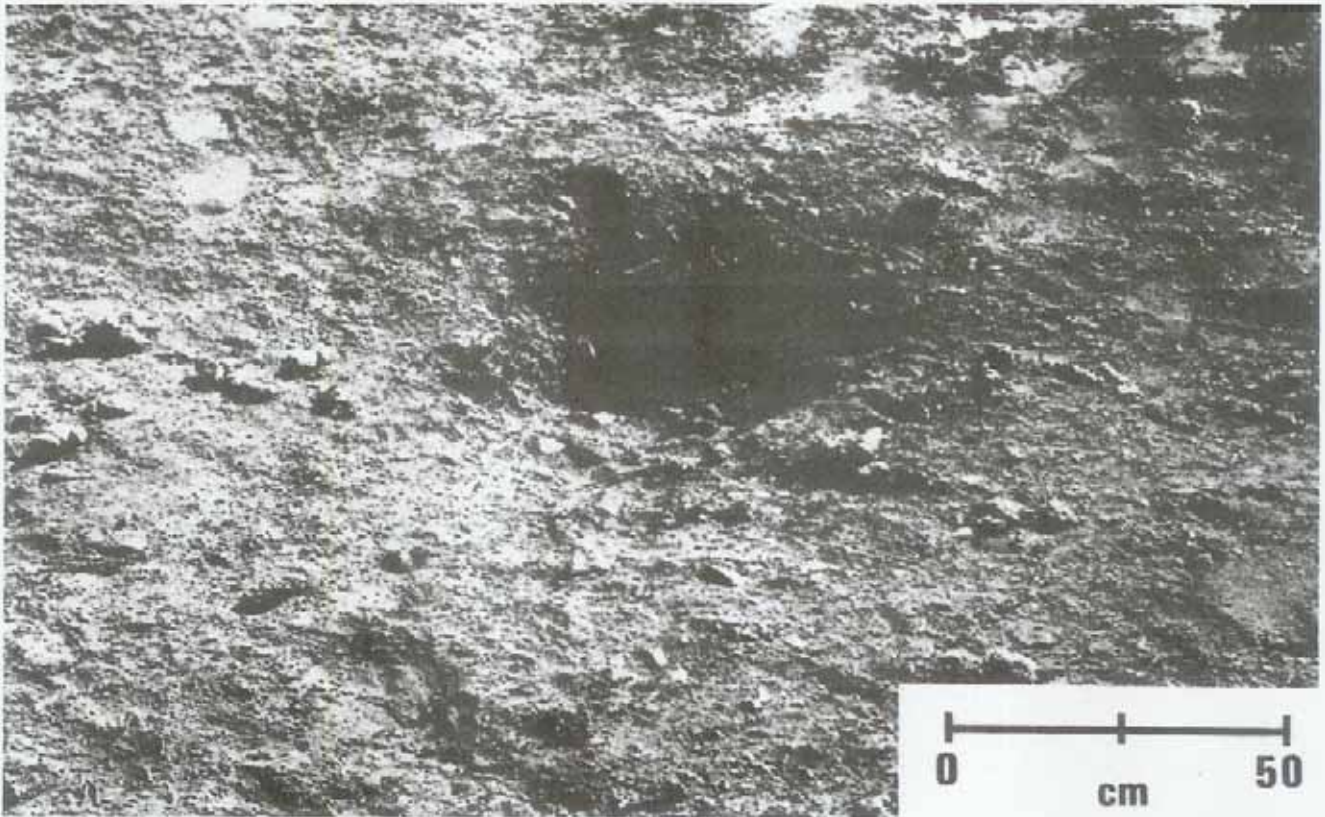


PLATE 2: Typical latrines of *H. brunnea* showing the hollowed out area in the centre (2 plates).



PLATE 3: Dead seals washed up by the tide at Wolf's Bay for hundreds of metres.

TABLE 1: Animals consumed by *H. brunnea* and *C. crocuta* in the southern Namib Desert as identified from remains found in scats and calcium content of scats.

	<i>H. brunnea</i> Wolf's Bay	<i>C. crocuta</i> Koichab Pan
Mass of faeces (g)	4 569,5	5 793,0
No. of scats	68	36
Species identified (% occurrence)		
<i>Arctocephalus pusillus</i>	75,0	—
<i>Cantus mesomelas</i>	7,4	2,8
<i>Oryx gazella</i>	—	94,5
<i>Procapra capensis</i>	2,9	—
<i>Lepus capensis</i>	1,4	—
<i>Desmodillus auricularis</i>	19,1	—
<i>Tatera</i> (probably <i>brantsi</i>)	—	2,8
Feathers genus <i>Falco</i>	4,3	—
Feathers unidentified	1,4	—
Scorpionidae	2,9	—
Calcium content of scats (mg/100 g)	14,3±7,6 (n=20)	13,6±5,1 (n=19)

Moreover, prey remains in the Koichab Pan area which almost certainly resulted from *Crocuta* (Plate 4) indicated that the entire carcass plus the skull was consumed; this was evident from a freshly consumed sub-adult gemsbok. This probably reflected a scarcity of food although a number of gemsbok (24), springbok (41) and ostriches (26) were resident in the area and permanent watering points were provided along the water pipeline to Lüderitz to encourage ungulates to remain in the area, the limiting commodity being herbage and even the nearest *Acacia erioloba* trees were a few kilometres distant. Nevertheless, gemsbok are probably the most important prey item for hyaenas in the area and their remains (horns) were found almost exclusively on a sandy substrate. Although these devoured gemsbok could not be accurately aged due to the amount of material retrieved, it would appear that 80 per cent were mature

and several horns showed considerable wear (Plate 4). The hairs of *H. brunnea* were recorded in three *H. brunnea* scats and of *Crocuta* in six *Crocuta* scats, but these were almost certainly the result of grooming.

During further controlled experiments over seven days using a captive adult female and subadult male brown hyaena, the amount of calcium ingested (mean = 7,1 and 6,4 mg/100 g respectively) was not significantly correlated with the calcium defaecated (mean 12,9 and 5,3 mg/100 g respectively) — that in the faeces was significantly higher than in the food of the adult female.

4 DISCUSSION

The distribution and numbers of hyacinidae in the Namib Desert are poorly known. Data from Stuart (1975), Skinner (1976) and Tilson *et al.* (1980) have been included to bring the present map as up to date as possible. It would appear that the south-western coastal Namib Desert is preferred by the brown hyaena although, because it is a diamond area, we were precluded from making a thorough survey.

The question that arises on studying the distribution is why are spotted hyaenas not utilising the abundant food supply along this coast. The nearest recorded spotted hyaena at Koichab Pan were only 70 km from Wolf's Bay, and others further north may be even closer to the sea. On comparing the numbers and distribution of *Crocuta* with *H. brunnea* several factors seem important. First, *Crocuta*, as in other areas, associated in clans in the Namib Desert (Tilson *et al.*, 1980) whereas *H. brunnea* under the prevailing conditions and as most other observers have found (Skinner, 1976; Mills, 1978a), apparently scavenge on their own, a system which will favour the individual in areas of food scar-

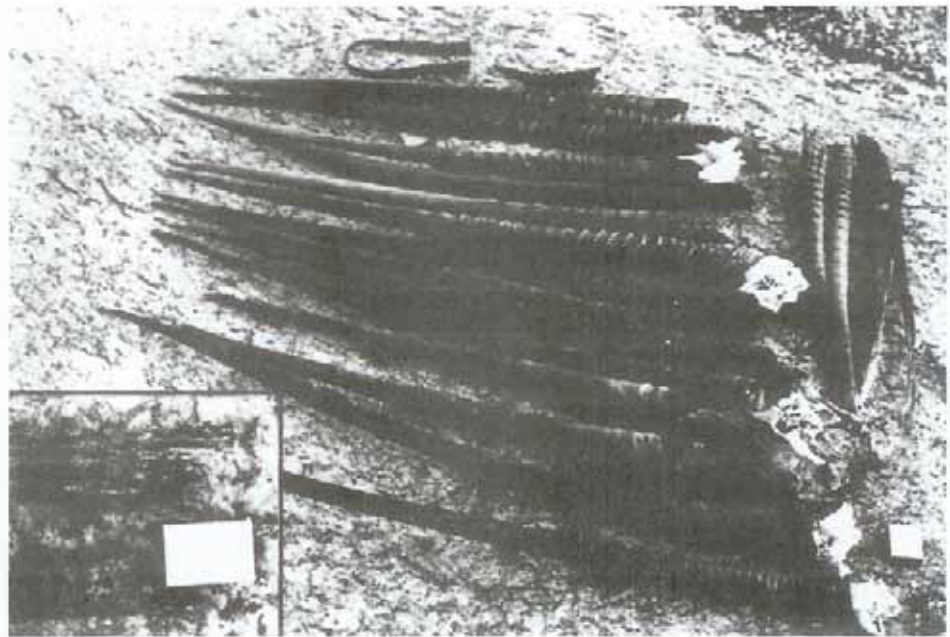


PLATE 4: Gemsbok horns were the only prey remains found at Koichab Pan.

city. In addition the distribution of *Crocota* is closely associated with that of the gemsbok *Oryx gazella* which would appear to be a preferred "prey" animal. Moreover, the distribution of *Crocota* is also closely associated with the availability of drinking water; both the latter factors pertaining at Urihauchab where there is an oasis in a mountain kloof and where there are *Crocota* latrines and individuals have been seen there and at Koichab Pan. Not only is fresh water absent along the coast, but the available food may have a higher salt content being largely of marine origin. It would seem therefore that *H. brunnea* may be adapted for living in an arid environment which is also borne out by our knowledge of its past and present distribution (Skinner, 1976). It may therefore be worth examining renal function and other aspects of maintaining a positive water balance in the two species if the real reasons are to be established. For example, as in the northern Transvaal (Skinner, 1976) it would appear that *H. brunnea* digs extensive burrows and lives underground during daytime which would favour water conservation in the desert. *Crocota*, on the other hand, does not seem to favour life underground (Bearder, 1977).

It would seem that where the two species co-exist they are geographically separated. Obboussier (1979) has pointed to the later evolution of *Crocota* and its greater size which favours social grouping and an individual *H. brunnea* would be no match for a *Crocota* clan; as has indeed been noted for individual *Hyaena hyaena* and a pack of six *Canis lupus* (Skinner & Ilani, 1980).

It was disappointing that no *H. brunnea* scats could be found in the Koichab Pan area. Individuals do and have

occurred in the vicinity of Aus (F. von Blotz, pers. comm.) and the spoor of *H. brunnea* was noted some 20 km south-west of the pan. Nevertheless, springbok, gemsbok and ostrich do occur in the area adjoining Wolf's Bay and a gemsbok put out for bait to lure hyaenas to the camera did attract a brown hyaena to a site some 50 km south-east of Wolf's Bay (du Toit, pers. comm.), but a thorough search revealed no hairs in *H. brunnea* scats from any of these species. This is an indication that they are either not favoured at all but more probably that they are unavailable to *H. brunnea*, the number that die from natural causes in an area so sparsely populated by ungulates being so small that their impact on the diet of *H. brunnea* is insignificant. It is surprising that with such an abundance of seals, their hair only occurred in 75 per cent of *H. brunnea* scats, an indication that this source of food is perhaps not preferred. The 7.4 per cent occurrence of jackal hair *Canis mesomelas* is a reflection of the large numbers occurring in the vicinity of the seal colonies and probably also reflects dead or dying jackals and therefore those available to *H. brunnea*. A corpse which we put out was removed by a hyaena the same night; and a brown hyaena was observed killing a jackal at Black Rock (P. Shaughnessy, pers. comm.). It would appear that the canids are a preferred food item of *Hyaena* (Skinner, 1976; Skinner, Davis and Ilani, 1979). Indeed during the 1976 survey it was reported that *H. brunnea* caught a Pekinese dog *Canis familiaris* in front of a dwelling in the town of Walvis Bay and carried it away. The other prey items are probably indicative of their availability in the coastal Namib. While *Procapra* and *Lepus* may have been scavenged or accidentally caught, the high incidence of *Desmodillus*

would indicate the possibility of their being a sought-after prey item of *H. brunnea*.

In contrast to the more catholic diet of *H. brunnea*, *Crocota* fed almost exclusively on gemsbok in the Namib. These results are in close agreement with the analyses of Tilson *et al.* (1980) and, as pointed out previously, the situation at Koichab Pan is similar to that in the vicinity of Natab in the Kuiseb River area but with fewer ungulates. If, as Tilson *et al.* (1980) and the available data suggest, *Crocota* are catching gemsbok, then there must be some weakness *Crocota* are exploiting as the absence of springbok hair or ostrich feathers in our results and Tilson's value of 0.8 and 2.1 per cent for springbok and ostriches respectively means that these species are not procurable by *Crocota*. Their absence from the diet and the fact that gemsbok remains were also found largely on a sandy substrate indicates that the weaker or maimed individuals may be being brought down here; again, the few observations we made are in close agreement with those of Tilson *et al.* (1980) for Natab. No significant quantities of vegetable items were found in the scats from Koichab Pan, but our visit was preceded by two very dry seasons, so this may also reflect availability; even more so for the more arid Wolf's Bay where herbage was largely absent.

It is interesting that *Crocota* also sampled jackals and rodents, in the latter case *Tatera*; while *Desmodillus* and *Gerbillurus* which are present at Koichab Pan (Skinner, Lindeque, Van Aarde and Dieckmann, 1980) did not feature at all in their diet.

5 CONCLUSIONS

It has been established that the brown hyaena, although a rare and endangered species, is more widespread than was at first thought (Joubert & Mostert, 1975), but we still have no idea what numbers occur in the area or details of their habits or range. In addition the relationship with other carnivores particularly scavenging or preying on seals is unique as is the ability of a land carnivore to subsist in such an arid environment. Despite security precautions there is an urgent need for: (1) a helicopter survey using night flares or at first dawn along the entire coastal strip to count brown hyaenas and inland from the Kuiseb River southwards and north of Swakopmund to ascertain distribution and numbers of both species; (2) Wolf's Bay presents an ideal situation for a study of hyaena ecology, ethology and physiology and an exciting and unique project could be undertaken on this rare carnivore; (3) failing these steps which should enjoy the highest priority, further surveys of as extensive a nature as circumstances will allow, should be undertaken to enhance our knowledge of this important species to enable its continued conservation; (4) the municipal area surrounding Lüderitz should be declared a Nature Reserve under the jurisdiction of the SWA Directorate of Nature Conservation and in which all species including the carnivores are protected.

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