these the edge was dusky but in several it was dark brown. If Bell Marley's staining represents the pigmentation of the live holotype, then he collected an unusually dark specimen. It is more likely, however, that a mistake had been made and the wrong fish was stained. One species that typically has dark-edged scales and the 'network' pattern described by Smith (1961) is *Apogon kallopterus* (Gon 1986: pl. 51, fig. 175.2), a common resident of Natal reefs.

It is not clear to me why Smith (1961) did not include the second specimen, which was collected in 1948, in his description of *Apogon enigmaticus*. It is possible that this specimen was identified as the latter species after the original description had already been published, but there is no record of the original identification of the fish. In view of Smith's (1961) reasoning for naming *A. enigmaticus* (see introduction above) and his prolific scientific writing, it is rather unusual that he did not report the finding of the second specimen. This specimen is undoubtedly *A. apogonides*. It is in relatively good condition and has the same colour features of recently collected and preserved *A. apogonides*, i.e. a darkish stripe from the the tip of the snout to the eye with some traces on the opercle, a dark tip of the first dorsal fin and a dark intestine. Since it has no dark-edged scale pockets and its dentition is typical of *A. apogonides*, I can only assume that the relatively high total gill-raker count (Table 1) caused Smith to call it *A. enigmaticus*. In the Apogonidae, however, the number of developed gill rakers and their distribution on the first gill arch is a more distinctive character. Within a species, it is less variable than the total number of gill rakers (Table 1) and often provides better resolution in separating closely related species (unpublished data). In the present case, the number of developed gill rakers clearly relates both specimens of *A. enigmaticus* to *A. apogonides* (Table 1).

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Speculations on colonizing success of the African clawed frog, *Xenopus laevis* (Pipidae), in California

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The African clawed frog has been established in California for over twenty years. During that period, populations have spread to most of the drainage systems in southern California. It is suggested that a suite of contributing factors, including morphological, behavioural, and biochemical predator avoidance strategies, and reproductive and feeding (cannibalism) strategies, have aided in the success of this species in an extralimital situation.

Die gewone platanna is reeds langer as twintig jaar in Kalifornië gevestig. Gedurende hierdie tydperk het bevolkings versprei na meeste van die dreineringsstelsels in suidelike Kalifornië. Daar word voorgestel dat 'n reeks faktore, wat roofdierontwykingsstrategieë in terme van morfologie, gedrag en biochemie, sowel as voortplantings- en voedingstrategieë (kannibalisme) insluit, bygedra het tot die sukses van hierdie spesie in 'n ekstralimitale situasie.

The African clawed frog *Xenopus laevis* has been reported as an alien species in many areas of the United States, the United Kingdom, and Ascension Island (McCoid & Fritts 1980a). In the United States, established populations are known from Virginia, Arizona (R. Tinsley, pers. comm.), and California. *Xenopus laevis* was first reported as an exotic species in California over twenty years ago (St Amant & Hoover 1969). Since that time, few studies bave been published regarding the natural history of feral California populations (St Amant, Hoover & Stewart 1973; McCoid & Fritts 1980a; b; 1989; McCoid 1985) and none on other U.S. populations.

Naturally occurring permanent bodies of water in southern California are rare and all populations occur in situations that have been impounded or channelized, creating permanent to semi-permanent bodies of water where none had existed historically. The common factor in all established populations in southern California is the use of highly disturbed habitats. We examined populations of *X. laevis* in drainages of the Santa Margarita, Sweetwater, and Tijuana Rivers.

In California, *X. laevis* form dense populations (McCoid & Fritts 1980b). A contributing factor to the species' success in California appears to be reproductive strategies. Breeding in *X. laevis* is opportunistic and ovulation asynchronous (Dumont 1972; Fortune 1975) allowing reproduction to occur over most of the year in southern California (McCoid & Fritts 1989). While eggs and larvae are most commonly found between February and June (a period of

increasing day length and temperature, presumably stimulating growth of the larval food source, phytoplankton), reproduction bas been recorded in all but the coolest months (November and December). This is in contrast to the shorter breeding season of *X. laevis* in South Africa (Kalk 1960). Additionally, *X. laevis* are characterized by early maturation (eight months), are long-lived (4,5 to 15 years), and large numbers of offspring can be produced (to 17,000 eggs per female) (McCoid & Fritts 1989).

Feeding strategies may also have played a role in the successful colonization of southern California. Behavioural evidence indicates that *X. laevis* are particularly inept predators of actively swimming prey (Avila & Frey 1978) and cannibalism may allow occupation of habitats that have low densities of non-conspecific adult prey. McCoid & Fritts (1980b) found that although invertebrates formed the major component of the diet in a recently established population, *X. laevis* larvae and eggs were the most common vertebrate prey item recorded in stomachs of this population. In another population that had been established for a number of years in southern California, small numbers of crayfishes (Astacidae) and large numbers of *Xenopus* larvae were the dominant prey items recorded from stomachs (unpubl. data). We suggest that as California populations of *Xenopus* deplete their available prey base, there is an increased dependence on cannibalism.

The phenomenon of cannibalism is not unique to extralimital populations; native populations of *Xenopus* are also characterized by this behaviour. Leslie (1890) noted that conspecifics were consumed. Hey (1949) recommended that when culturing *Xenopus*, adults should be removed to prevent cannibalism. Kalk (1960) found that adults consumed small crustaceans and insect larvae at the beginning of the reproductive season and then included conspecific larvae in their diet later in the year. Simmons (1985) indicated a similar picture to Kalk but his study did not have a seasonal component. Savage (1963) speculated that *X. laevis* normally relies on its own larvae as a food source. In a related species, *X. clivii*, Buxton (1936) remarked on the paucity of potential food organisms in a 'huge' population of adults and suggested that this population was existing entirely on conspecific larvae.

In Africa, *X. laevis* have evolved morphological, behavioural, and biochemical predator avoidance strategies (Baird 1983; Videler & Jorna 1985; Zielinski & Barthalmus, 1989). In extralimital situations, particularly southern California, it is likely that predatory pressure is considerably reduced, thus contributing to the success and spread of *X. laevis*. For example, Barthalmus & Zielinski (1988) demonstrated that the mucus of adult *X. laevis* enhances escape success of frogs by inducing a gaping response in predaceous North American water snakes. Larval *X. laevis* are mid-water schoolers, but by breeding in artificial or temporary bodies of water where most large aquatic predators are absent, predator pressure could be reduced. Hey (1949) and Prinsloo, Schoonbee & Nxiweni (1981) discussed control techniques for *X. laevis* larvae in fish culture ponds and advocated the use of introduced predatory fishes. This suggests that the creation of artificial habitats (farm dams) in South Africa may have aided in the dispersal of *X. laevis* in the native range (Picker 1985; Simmons 1985). In southern California, established and successfully reproducing populations occupied sites lacking predatory fishes.

The colonizing success of *X. laevis* in California is apparently due to great reproductive potential, feeding (cannibalism), and predator avoidance strategies. It is also likely that the disturbed habitats in southern California are somewhat similar to disturbed habitats (farm dams) found in South Africa (Picker 1985).

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A vagrant Subantarctic fur seal *Arctocephalus tropicalis* found in the Comores

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A juvenile Subantarctic fur seal, *Arctocephalus tropicalis* was caught near the island of Anjouan, Comores, about 500 km off the east coast of Africa, on 20 August 1990. This record represents a northerly extension by some 1800 km of the recorded east coast range. The breeding colonies of this species are on temperate islands north of the Antarctic Polar Front. The closest colonies are on Amsterdam Island and the Prince Edward islands, nearly 4000 km south-west and south, respectively of this sighting.

'n Onvolwasse Subantarktiese pelsrob, *Arctocephalus tropicalis*, is op 20 Augustus 1990 op die eiland van Anjouan, sowat 500 km van die ooskus van Afrika af, gevang. Met hierdie waarneming word die voorheen opgetekende ooskusverspreidingsgebied, met ongeveer 1800 km noordwaarts uitgebrei. Die teelkolonies van hierdie spesie is op gematigde eilande noord van die Antarktiese Poolfront. Die naaste kolonies is by Amsterdam- en die Prins Edward-eilande, amper 4000 km onderskeidelik suidwes en suid van hierdie waarneming.

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On 20 August 1990, a seal was caught by fishermen near the village of Vassi, on the south-west coast of Anjouan Island (12°30'S / 44°30'E), Comores, about 500 km off the east coast of Africa. It was transported from there, still alive, to the capital, Mutsamudu, where it was put on display. Local people had apparently never seen a seal before and crowds gathered to view the 'monster'. Later the same day the animal was killed and was preserved in a domestic freezer, owing to lack of other facilities. Some photographs of the animal were taken after death. From the buff-coloured muzzle, chest and throat shown in the photograph (Figure 1), it seems clear that the seal was a Subantarctic fur seal *Arctocephalus tropicalis*. Its sex is unknown but it is more likely to have been male, since Shaughnessy & Ross (1980) found that 16 out of 22 (73%) *A. tropicalis* strandings in southern Africa were males. From the estimate of body weight made after death (24 kg), the animal was likely to be a juvenile. The specimen was apparently thrown away before any arrangements to preserve it could be made.

This represents another interesting record of an individual *A. tropicalis* occurring far from the nearest known colony. A previous example of this was the sighting of two adult males on the African west coast, at the mouth of the Kwanza River, Angola (9°20'S / 13°09'E) on 2 October 1983 (Carr, Carr & David 1985), about 2700 km north of any previous west coast sighting.

Records of 22 vagrant Subantarctic fur seals that beached themselves around the coast of southern Africa between 1966 and 1979 show that the most northerly sighting was at Richard's Bay (28°47'S / 32°05'E) on the east coast in 1977 (Shaughnessy & Ross 1980). Therefore, the present record represents a northward extension of the recorded east coast range by about 1800 km. The timing of the sighting (August) also falls within the winter period identified by Shaughnessy & Ross (1980) as that during which most strandings occurred in southern Africa. They found that 19 of the 22 records occurred from May through September.

The breeding sites of *A. tropicalis* are situated on temperate islands north of the Antarctic Polar Front: the largest colony is on Gough Island, with other large colonies on

Figure 1 The subantarctic fur seal lying in the bottom of a dugout canoe on Anjouan Island. Note the pieces of bread with which it had apparently been fed.