SMALL CARNIVORE CONSERVATION

The Newsletter and Journal of the IUCN/SSC Carnivore Specialist Group

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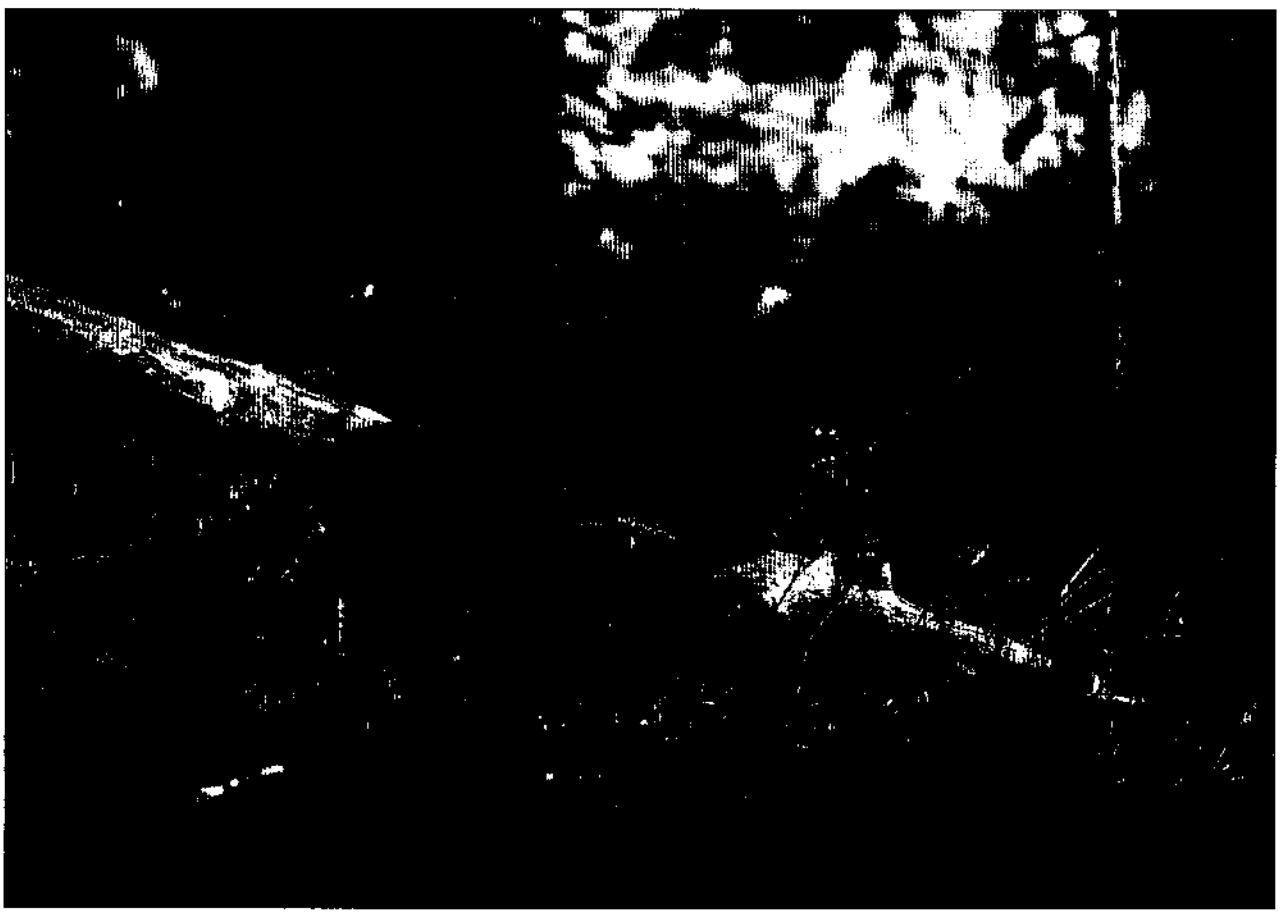

Adult female Wolverine Gulo gulo, *north east Finland – Photo: Jeff Cain*

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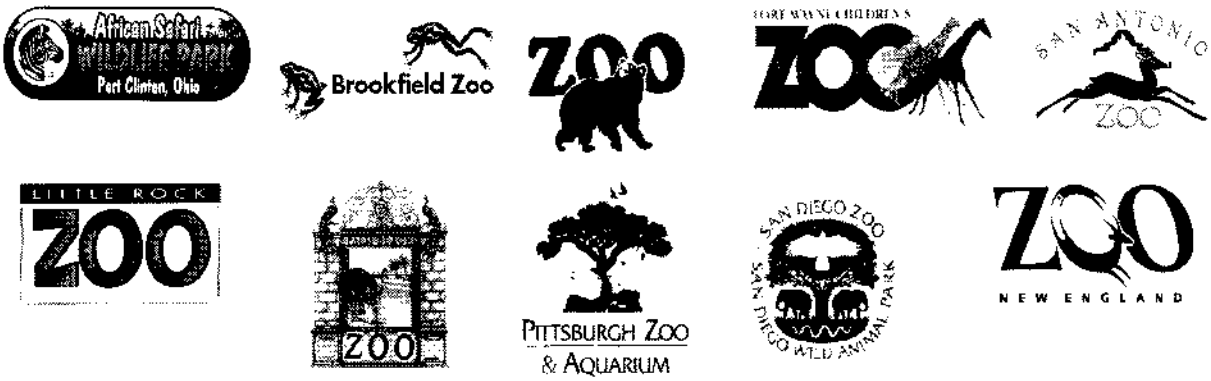

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The aim of this publication is to offer the members of the IUCN/SSC Carnivore SG, and those who are concerned with mustelids, viverrids, and procyonids, brief papers, news items, abstracts, and titles of recent literature. All readers are invited to send material to:

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Editorial

Dear Specialist Group members and Small Carnivore Conservation readers,

As many of you already know, in Dec 2003 I have been appointed by the SSC Chair, David Brackett, as chair of our group.

My interest in small carnivore conservation, as it is the case for many of us, stems not only from my limited work on the ecology and behaviour of a few mongoose species, but especially from a child passion. The invitation to serve as chair was, quite obviously, a great honour for me.

I think our group needed some restructuring, and I started with improving internal communication by means of a dedicated mailing list, open to all members as well as to non-members. It is a great pleasure to see the list gaining momentum, starting interesting discussions both the internal life of the group and on more general themes related to conservation.

I acknowledge that not all group members can be reliably reached by e-mail, and we agreed that some of us will act as links to those, often extremely valuable, who are more difficult to reach.

At the same time, thanks to IUCN for web hosting, and to my own firm for other computing resources, I wrote a web site for the group. As a field zoologist, I do not have the skills necessary for preparing fancy layouts, but I hope you'll find it useful. Among other things, our Action Plans and several papers of interest are freely available from the web site. I consider this as a success, in that it greatly improves our visibility to the outside world, regularly attracting visitors; several of them subscribe to the mailing list and/or send me interesting suggestions and proposals.

Furthermore, after due consultation and discussion through the mailing list, we agreed in changing the name of the group; the change was recently accepted by the SSC. This choice has its shortcomings, correctly pointed out by some members, but I believe "Small Carnivore" will be far easier to understand and remember, and as such will help making the group better known and successful.

As a next step, we agreed in weeding out inactive members, accepting some new proposals, and actively seeking new members, in order to achieve a good taxonomic and geographic coverage. Your suggestions will be welcomed.

We also need better links with other groups dealing with mustelids, viverrids, herpestids, and procyonids, taking advantage of each other's advancements and achievements, and possibly setting up joint projects. All this requires fare more work than I forecast, and probably in the long run more than I can afford.

Your help is therefore crucial for the future of the group. Relevant tasks include:

- producing popular papers material, press releases and statements, both on long-standing issues (e.g. predation, hunting and trapping, invasive species, importance of surveys, etc.) and on "hot" issues (e.g. the SARS/civet one) and helping distributing it to appropriate media
- participating to conferences and symposia as delegates of the group, and more generally linking with other groups, keeping our SG informed about their activities and opportunities for collaboration
- managing the web site: there is little point in having a site, if it is not up to date; now that the site is set up, it is easy to update it with new information
- managing our membership database, ensuring the correctness of information and linking it with the central IUCN database
- last but not least, we need financial support, both for basic activities (including the Newsletter, probably the single most important achievement of the group) and for projects. In our present situation, even small donations would greatly help keeping the group alive. I am ready to endorse and support good ideas and projects, and I ask you to do your best raising interest in our activities.

Looking forward to further collaborate with you, I wish you a fruitful period, both in your professional activities and especially as members of the Small Carnivore Specialist Group.

Paolo Cavallini

The Cretan Stone Marten *Martes foina bunites*

Boris KRYŠTUFEK

In the IUCN Conservation Action Plan for the Conservation of Mustelids and Viverrids, Schreiber *et al.* (1989) listed the Stone Marten *Martes foina bunites* (Bate, 1906) from the Island of Crete as being possibly threatened on one hand and very little known on the other. This question was further discussed in a issue of *Small Carnivore Conservation* by Schreiber (1999). During my recent visit to Crete (April 26th to May 2nd, 2003), I collected further information on the Cretan Marten which, together with a compilation of published data and examination of museum specimens, allows a more synthetic review of the Stone Marten population living in isolation on the largest Aegean island.

Distribution

Information concerning the distribution of carnivores in Greece was very scanty until the mid-1980s when Prof. J. Matsakis initiated the project "A Survey of the Fauna of Greece". Anyhow, the distribution of mustelids on Greek islands remains largely undocumented (Catsadorakis *et al.*, 1999). The Atlas of European Mammals thus mapped the Stone Marten, as well as some other carnivores under the presumption as being widespread on Crete (Mitchell-Jones *et al.*, 1999). Similarly Sfikas (2002) states that the species is "*... present all over the island*", although he provides no evidence in support of this.

Actual knowledge on the distributional status of the Stone Marten on Crete is summarised in Fig. 1. Although the species was listed for the island already by Raulin (1869) and later by Barrett-Hamilton (1899), no exact locality was known by the end of the 19th century. During her four-and-a-half month visit to the island in the earlier part of 1904, Miss Dorothy Bate (Bate, 1905) collected five skins, now stored in The Natural History Museum London (BMNH) and with individual animals labelled as: near Canea (= Hania), Canea, Malaxa near Canea, and Katharo. Miller (1912) reports localities for the same series as Kontopalo near Kania, Kanea, Katharo, and Kontopalo. While elaborating material collected during the Balkan research expedition in 1942, Zimmermann (1952) had at his disposal a sample from Nida highlands and also reported "Weisse Berge" (= Levka Ori) as another place of occurrence. Niethammer & Niethammer (1967) report skins photographed in 1966 at the market in Sitia. Newer records are by Catsadorakis (1994) for Samaria National Park and by Schreiber (1999) for eastern Crete.

So far, the Stone Marten has been recorded from at least 21 localities which are widely scattered across the island. Since the majority of records are road casualties, one should not expect the scatter to reflect the actual distribution of the species, being rather an artefact of the network of fast roads (*cf.* also Schreiber, 1999). Because of this and considering the conclusion by Schreiber (1999) that the Stone Marten inhabits an extensive variety of habitat types, it is safe to conclude that the species is widespread in Crete.

Historical distribution

Archaeological evidence, which is abundant in Crete, strongly suggests that the Stone Marten had not reached the island before the Early Neolithic. Namely, the earliest indisputable finds are from the Early Neolithic II (Jarman, 1996). While marten remains have also been collected in four caves which produced Pleistocene fauna (Gerani II, Mavromouri I and VII, and Liko), Gerani II also produced in the upper layers Neolithic archaeological material and some Holocene mammals (*Sus, Rattus, Oryctolagus*). In Liko cave, the

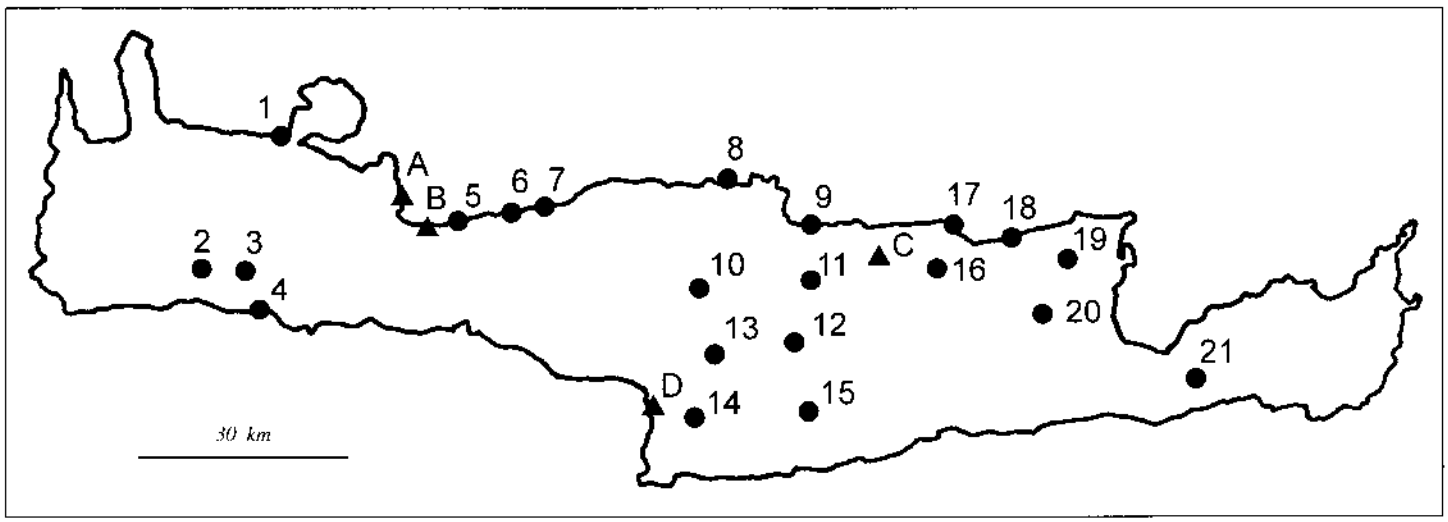

Fig. 1: Localities where the Stone Marten was recorded on Crete. Dots are recent records and triangles indicate the archaeological material.

Recent records: 1 – Kanea (= Hania); Kontopalo near Kania (= Hania); 2 – Weisse Berge (= Levka Ori); 3 – Samaria; Samaria National park: Omalos plateau; 4 – Agia Roumeli; 5 – between Gerani and Episkopi; 6 – Rethymno; 7 – Sfakaki, east of Rethymno; 8 – east of Sises, Iraklio; 9 – 3-4 km west of Iraklio; 10 – Nido highlands; 11 – Dafnes; 12 – Agios Varvara; 13 – Zaros; 14 – near Mires; 15 – Stoli; 16 – Karouzano; 17 – Hersonisos; 1 km south Hersonisos: near Piskopiano; 18 – Malia; 19 – 1 km and 4 km south-east of Neapoli, respectively; 20 – Katharo; 21 – Foothills of the Oris Thriptis Mts (on the way from Ierapetra to Gournia). Archaeological records: A – Liko cave; B – Gerani cave II; Mavromouri caves I and VII; Simonelli cave; C – Knossos (Early Neolithic II, Minoan period); D – Ayia Triadha (= Aghia Triadhma; Late Minoan).

Sources: Catsadorakis (1994): 3, 4; Jarman (1996): C; Miller (1912): 1, 20; Schreiber (1999): 9, 17, 19, 21; Sondaar et al. (1996): B, D; Steesma & Reese (1996): A, B; Zimmermann (1952): 2, 10; The 2003 survey: 5 – 8, 11 – 18.

marten comes from the upper layers, which also produced Holocene species (*Ovis/Capra, Rattus*; Steensma & Reese, 1996).

Crete is an ancient island, which has not been connected to the mainland since the Early Pliocene, 5 Myr BP (Dermitzakis, 1990), and must have attained its present form at the end of the Pliocene (Sondaar *et al.*, 1996). Its Pleistocene fauna is impoverished, unbalanced and abounds with endemics. Ancestors of the Pleistocene species thus most likely reached Crete by the sweepstake route when it was already an island. There is no evidence that any marten was amongst them. Endemic fauna became extinct in the early Holocene, with man's arrival on the island (Sondaar *et al.*, 1996). All recent terrestrial mammals, with the exception of the endemic shrew *Crocidura zimmermanni*, were introduced to Crete by humans. For the Stone Marten, Sondaar *et al.* (1996) believe it is unlikely that the animal reached the island by swimming or rafting, but was rather brought there by man.

Sondaar *et al.* (1996) questioned whether there was a single invasion of the Stone Marten followed by the evolution of the endemic race, or whether the process of adaptation and endemism was obscured by multiple invasions. Different intermediate stages between the mainland forms and the recent endemic type of the Cretan Stone Marten speak in favour of the latter hypothesis (Sondaar *et al.*, 1996). Besides, introductions were possibly even intermixed by local extinctions. Thus, Jarman (1996) found the Stone Marten in the Early Neolithic layers in Knossos, but the species was absent from the Middle and Late Neolithic material, and then reappeared in the Minoan period.

Steensma & Reese (1996) believe that "... *nearly all the material* [from Gerani, Mavromouri and Liko caves] *belongs to individuals which are intermediate in form between the Recent endemic species of Crete* [*i.e.* M. f. bunites] *and their Near Eastern relatives*." Eastern Mediterranean coasts, rather than the Balkan peninsula, were thus the most probable source of the Stone Marten colonisation of Crete.

Habitat

Stone Marten seemingly live on Crete in a broad variety of habitats, which were all exposed to a millennial human impact, mainly degradation. It was observed equally well along short grass pastures with spots of barren land (Schreiber, 1999), in dense patches of evergreen woodland, in a suburban environment, in maquis, both dense and degraded to phryagana, in olive plantations, etc. My observations accord with those by Schreiber (1999), including the conclusion that the marten is common in overbrowsed phryagana, which is the dominant vegetation type on the island.

Catsadorakis (1994) reports the Stone Marten for all of his geographic/vegetational entities of Samaria National Park, i.e. for maquis (*Pistacia lentiscus, Ceratonia siliquia, Juniperus phoenicea, Myrthus communis, Quercus coccifera, Olea europaea, Erica verticillata*), phryagana (*Poterium spinosum, Thymnus capitatus, Cistus villosus, Euphorbia acanthothamnos*), woodland (*Pinus brutia, Cupressus sempervirens, Acer orientalis*), alpine and subalpine belts (grasses, *Astragalus* spp., *Acantholimon echinus, Berberis cretica, Juniperus oxycedrus*), and for gorges. He found it to be relatively more common and more widespread than any other mammal covered by his survey, including the rat *Rattus rattus*.

Although the altitudinal range is poorly documented, the marten evidently goes from the seashore into the subalpine and alpine belts well over 1,500 m above sea level. Sfikas (2002) lists it for the mountainous zone that stretches between 800 and *ca.* 1,800 m above sea level.

Threats

The red data book of threatened vertebrates of Greece (Karandinos, 1991) does not include the Cretan Stone Marten. As mentioned above, Catsadorakis (1994) found the species to be common in the Samaria National park, and Sfikas (2002) states that "... *the population of* [the Stone Marten] *has increased extremely*" in the gorge of Samaria. It is not evident, however, on which grounds Sfikas' conclusion has been achieved (*cf.* also Schreiber, 1999). Keeping in mind the statement by Bate (1905) that "... *the Beech-Marten is common in the island, both in the low ground and in the hills*", a conclusion can be drawn that the species was common on Crete throughout the entire 20th century, although possible trends are a matter of speculation.

As far as one can speculate from road casualties, the Stone Marten is much more common on Crete than the Eurasian Badger *Meles meles* or the Least Weasel *Mustela nivalis*. Namely, during my 2003 survey I counted 18 martens but only three badgers (east of Rethymno; Kissamos, Kalidonia; and Ierapetra) and merely two weasels (near Agios Nikolaos and at Martha).

The entire Mediterranean ecosystem suffered tremendous changes in the last several millennia, and Crete was no exception in this respect (Grove & Rackham, 2001). Sfikas' (2002) conclusion that "... *the greater part of Crete's forests were still untouched during the Venetian occupation (1206-1669)*" is likely to be somewhat of a naive oversimplification. Much more probable seems to be Bottema's (1996) idea of "... *an enormous impact of mankind on the vegetation of Crete.*" Bottema further suggests that anthropogenic activity started as early as at the beginning of the 6th millennium B.C., while the Minoan culture (from *ca.* 3000 B.C. onwards) must have changed the vegetation fundamentally. It is thus plausible to conclude that the Stone Marten did not face much habitat deterioration during recent centuries, but rather thrived successfully in a degraded Mediterranean landscape for several millennia. While the Stone Marten's niche is squeezed in mainland Europe by the competitive exclusion with the Pine Marten *Martes Martes* (Delibes, 1983), it is likely to be relaxed on Crete in the absence of the congeneric competitor. As a matter of fact, the Stone Marten uses a broad array of habitats on the island (see above). Habitat degradation is thus an unlikely source of immediate threat for the further survival of the Cretan Stone Marten.

Sfikas (2002) states that most species on Crete are exposed to ruthless hunting. Schreiber *et al.* (1989) further report that all the mustelids on Greek islands are considered vermin and poisonous baits were still in use against the Cretan badger in 1980s. Even worse, an estimated 1,500 badgers are killed annually in Greece, despite the fact that the species has been completely protected all over the country since 1985 (Griffiths & Thomas, 1993). Although I have no data on the current hunting pressure and the annual bag as far as Stone Marten is concerned, both must have a long history. Jarman (1996), for example, states that "... *the marten was until recently exploited regularly for fur ...*" Hunting of Stone Martens is documented by Bate (1905) for the very beginning of the 20th century: "*It is killed in some numbers by the peasants, who bring the skins to the larger port-towns on the north coast, whence they are exported chiefly to Trieste.*" How far back the hunting is stretching its roots is a matter of speculation. It is well documented

that the badger was exploited on Crete as food source since the late Bronze Age (*ca.* 1100 B.C.) at the latest (Snyder & Klippel, 1996). Considering the fact that Charles (2000) reports clear evidence of the butchery of a Pine Marten in Mesolithic Britain, together with similar evidence for a badger, it is possible that the Stone Marten was exploited in a similar manner on Crete.

As suggested by Delibes & Amores (1986), unsustainable hunting for fur was the most probable cause of extirpation of the Stone Marten on the Balearic island of Ibiza. The species was presumably still common there around 1930 but vanished by around 1970. Hunting thus can pose a serious threat to a small and isolated marten population.

Schreiber (1999) paid attention to road casualties as a possible significant source of Cretan marten mortality. He counted five dead martens along 800 km of roads. Because of the rapid decomposition of carcasses under summer conditions of the Mediterranean climate, he believes all the five martens had been killed at most a few days before they were found. All the road casualties were along the modernised national road N 90 (roughly half of his survey) and none were found on side roads that were windy, narrow and sometimes bumpy. This would give *ca.* one marten killed per 100 km every few days. I counted eighteen dead martens along 1,800 km of roads. At least three martens were found freshly killed, thus victims of the previous night traffic. This would give an estimate of one kill per 600 km of road per night. However, since a significant part of my travel was on side roads, the number is possibly even higher. A very crude extrapolation suggests annual mortality of at least one Stone Marten per two kilometres of road. Considering that there are *ca.* 600 km of main roads on Crete (estimate deduced from Hellander & Oliver, 2002), *ca.* 300 martens might be killed on them annually. This would give *ca.* 3.6 martens per 100 km^2 (the surface area of Crete is 8,335 km^2). Compared to the annual bag in Slovenia (area 20,251 km^2), which amounted to 775 Stone Martens on average (i.e. 3.8 per 100 km^2; Kryštufek, 2000) between 1987 and 1990, the road mortality of Cretan Stone Marten appears to be high. In addition to unregulated hunting, the human-caused mortality might pose a threat to the island population.

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First recent record of the Small-toothed Palm Civet *Arctogalidia trivirgata* from Vietnam

Alex V. BORISSENKO[1], Natalia V. IVANOVA[2] and Gert POLET[3]

Several mammal surveys undertaken in Cat Tien National Park (e.g. Ling, 2000; Murphy, 2001; Murphy & Phan Duy Thuc, 2002) have resulted in finding most of the common Indo-Chinese species of large and medium-sized mammals, yet a number of species are still being listed as "unconfirmed" or "possible", based on extrapolation of the general distribution range or reports of local people (Pham Nhat *et al.*, 2001). The Small-toothed Palm Civet *Arctogalidia trivirgata* (Gray, 1832), however, was omitted from these lists until 2003 (reported by Polet & Ling, *in press*), when four sightings of this species were made at a locality not covered during previous survey efforts. Recently the species has been recorded from Cambodia (Walston & Duckworth, 2003) while Duckworth (1997) reports the species to be widely recorded in south and central Laos.

All sightings took place in the southern sector of Cat Tien National Park (Nam Cat Tien, Dong Nai Province) in the vicinity of a rapid in the Dong Nai River (11°27' N, 107°26' E) ca. 2 km southwest of Da Co forest guard station (Fig. 1). The observation site is a lowland, covered by mature semi-evergreen *Lagerstroemia*-dominated seasonally flooded forest. This area is part of a ca. 20 km^2 patch of more or less intact riverine forest surrounded by variously disturbed secondary growth formations and adjacent to another area covered with more mature forest located in the vicinity of the park's headquarters.

Animals were observed during nighttime surveys conducted along roads passing through the park, using a bicycle. Mammal eye shine was detected with a LED headlamp; subsequently a powerful halogen spotlight was used to observe the animals. Whenever possible, observations were confirmed by making technical photographs with Minolta AF cameras with the aid of Minolta Program TTL-controlled flash.

The first sighting was made on 31 January 2003 at ca. 5:30 a.m. One animal was observed and photographed sitting on a small tree ca. 15 m above the ground near the road (see back cover). It did not appear to be feeding, and no fruit or flowers were observed on that tree or in nearby canopies. After being spotlighted and photographed the animal climbed down a thin liana and retreated into the forest away from the dirt road.

The second sighting was made on the following evening (1 February 2003). Two civets (assumed to be a male and a female) were found on the same tree interacting and emitting loud characteristic vocalizations, however, no mating was observed.

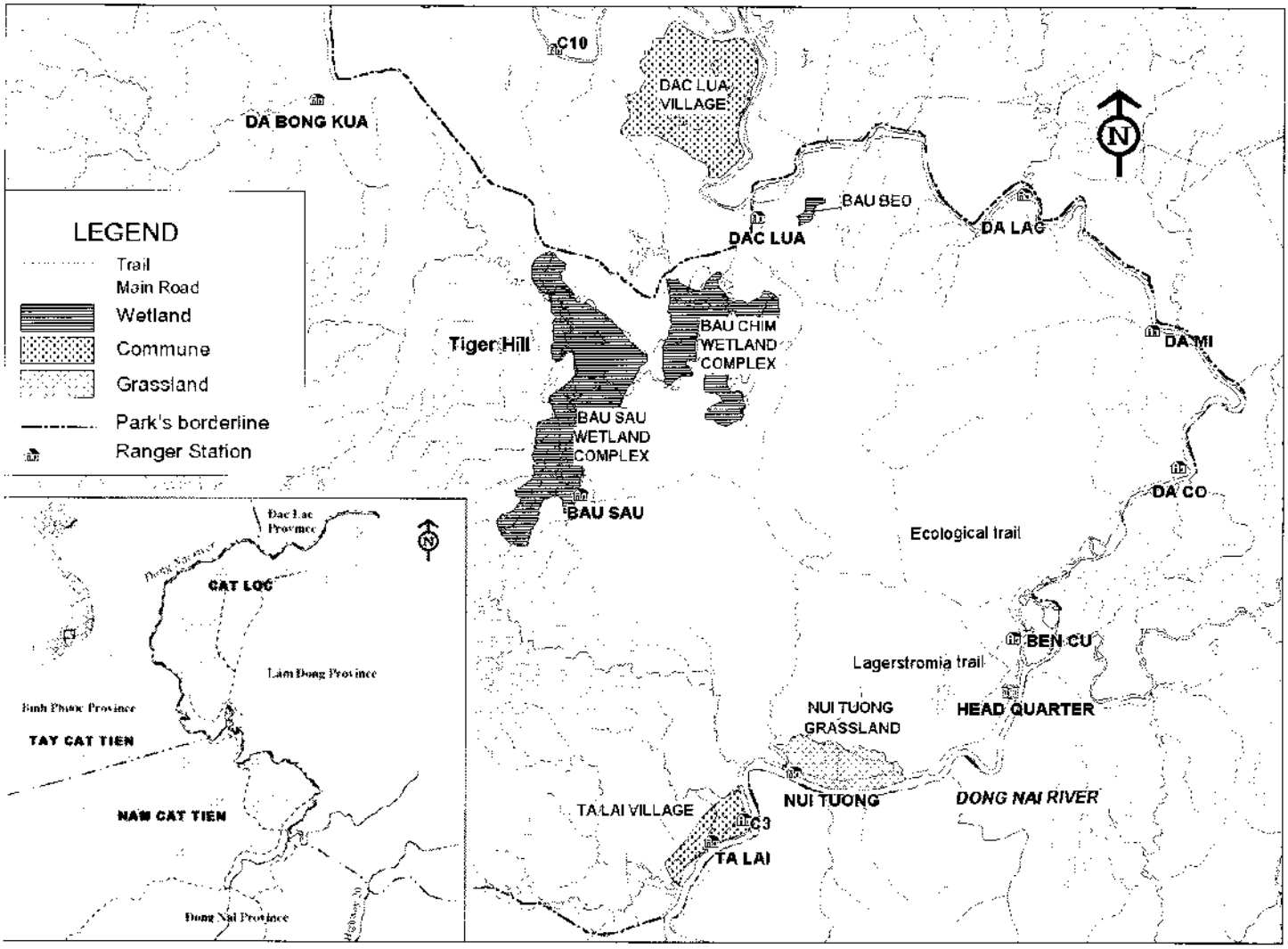

Fig. 1. Map of Cat Tien National Park, Vietnam.

From two subsequent observations made within a 30-minute interval (19:30 and 20:00) it appeared that the pair remained on the same tree throughout this period; however, they were gone by the time of the third pass (ca. 20:30). While examining the same place next morning it was noted, that one of the branches on the small tree was broken, suggesting that the animals may have returned there during the night. The animals did not show any signs of discomfort, despite that they were spotlighted for several minutes and photographed with a powerful flash during each pass. Duckworth (1997) in Laos also noted that the animals observed demonstrated tolerance to the presence of observers, the noise accompanying their approach, spotlighting and photographing.

The third sighting was made on 23 April 2003 at 22:47 near the road in the same forest, quite adjacent to the place of the first two sightings. One individual was sitting in the canopy of a tall tree ca. 50 m above the ground. It was identified by characteristic brown pelage and dark tail. Due to considerable distance, however, it was impossible to observe what it was doing in the canopy.

The fourth sighting was made on 29 April 2003 nearby the two previous localities. One individual was observed at the same spot within two consecutive time intervals (ca. 0:30 to 0:35 and subsequently 0:45 to 1:02 a.m.); it was sitting on a tree, and then descended into a thicket, where it started grooming and then continued moving slowly through the branches, allowing the observer to approach within ca. 5-6 m and take photographs of the animal.

Dates of these observations fit well with earlier observation in Laos between mid February and June which coincides with the main loud-calling season (Duckworth, 1997).

Several other attempts were made in April 2003 to observe the Small-toothed Palm Civet at the same locality (on evenings of April 2, 3, 5, 9, 12, 20, 22, 24, 25 and 28, 2003), however, they were unsuccessful. The overall spotlighting time at this site could be estimated as 15 hours (one sighting per 4 hours). This is more or less comparable with the 7-8 hours for one sighting estimated in Laos (Duckworth, 1997) where foot surveys (as opposed to using a bicycle) were held in comparable habitat (semi-evergreen forest along road).

All observed individuals possessed conspicuous pinkish-white markings on the ears, characteristic of the form *leucotis* (Corbet & Hill, 1992), brown dorsum with three dark longitudinal stripes, lighter-colored belly, and dark tail along most of its length, except for the basal part. The characteristic white stripe on the muzzle was not very prominent. Our observations of the Small-toothed Palm Civet made in Cat Tien National Park corroborate those made by Walston & Duckworth (2003) in Cambodia.

Due to the extensive conservation measures undertaken in Cat Tien National Park, the area where the sightings of the Small-toothed Palm Civet were made has not suffered from logging for at least two decades. In this particular part of the Park, there also seems to have been little or no hunting pressure for considerable time, particularly on canopy inhabitants, due to reasonably effective law enforcement. Indeed, the observation site appears to be quite rich in canopy wildlife. E.g., during the evening counts made on 1 February 2003, five Common Palm Civets *Paradoxurus hermaphroditus* and one Giant Flying Squirrel *Petaurista* sp. were spotted along the ca. 2 km segment of the road passing through this patch of mature forest. On the next morning vocalizations of at least two family groups of the Yellow-cheeked Gibbon *Nomascus gabriellae* were heard from the road.

Until recently there appear to be very few records of *Arctogalidia* in Vietnam (Dang Huy Huynh *et al.*, 1994), and recent records are unknown to exist for Vietnam. This may be due to the scarcity of mature forests suitable for nighttime transect surveys. But the species has been widely recorded in Laos (Duckworth, 1997) in secondary forests. Confinement of the Small-toothed Palm Civet to higher stories of the canopy explains why photo-trapping efforts deployed in Cat Tien National Park did not reveal this species earlier. Walston & Duckworth (2003) discuss in more detail how the species' nocturnal and strict arboreal lifestyle hamper its detection in mainstream biodiversity surveys, which have been conducted in Cat Tien National Park as well (Polet & Ling, *in press*). Also Duckworth (1997) notes that the species appears to often go undetected because of lack of people spotlighting and looking into the canopy at night, rather than because of lack of suitable habitat.

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Status of the Narrow-striped Mongoose *Mungotictis decemlineata* of Madagascar

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Introduction

The Narrow-striped Mongoose *Mungotictis decemlineata*, or *bokiboky* in Malagasy, is a small carnivore currently known to occur only in the dry deciduous forests of the Menabe region in western Madagascar. *Mungotictis* is Endangered (IUCN, 2002) and is threatened by the rapid loss of habitat through deforestation. Forest loss in the region of Menabe occurred at a rate of 32% between 1963 and 1993 as a result of agro-industrial projects and slash-and-burn maize cultivation (Tidd *et al.*, 2001), and this rate has since increased (J. Pinder, *in litt.* 2002). This article reviews the current status of *Mungotictis decemlineata* and discusses the immediate threats to its survival.

Relatively little is known about the ecology of this species. *Mungotictis* is a social animal that lives in family units. Groups of three to five adults may be observed together with juveniles during the dry season, which extends from June to October. During the warmer wet season, November to May, solitary males and groups of one adult with one juvenile are more commonly observed (Rabeantoandro, 1997). Albignac (1976) observed 'super groups' consisting of 9 to 13 individuals and noted a seasonal variation with these larger groups dividing into smaller 'sub-groups' during the wet season. Males seek contact with females from July to December. A gestation period of 90 to 105 days is generally followed by the birth of a single infant (Albignac, 1973). Razafimanantsoa (2003) observed mating in August and gestation periods of 74 and 106 days. *Mungotictis* densities are reported to vary from 0.25 to 2.9 animals per hectare (Rabeantoandro, 1997 ; Razafimanantsoa, 2003). Razafimanantsoa (2003) captured 20 adults and 6 subadults in an area of 90.3 ha. Eight of these animals lived permanently in the area as two separate groups of three and five individuals, with home ranges of 12.8 and 17.8 ha, respectively. Albignac (1976) found that small groups had home ranges of 30 to 50 ha and 'supergroups' had home ranges of 150 to 200 ha.

Mungotictis are primarily insectivorous, supplementing their diet with vertebrates (Rabeantoandro, 1997) including small mammals, reptiles and birds. Larger prey items such as mouse lemurs *Microcebus* may be co-operatively hunted by groups (Albignac, 1976). Specialisation on insect larvae in soil and decomposing wood may help *Mungotictis* survive during the dry season when the availability of other food items is limited. Their diet becomes more varied in the wet season (Albignac, 1976). *Mungotictis* use tree cavities, up to 10 m above the ground, for night shelters during the wet season and switch to burrows and abandoned ant hills in the dry season (Albignac, 1976).

Status

Mungotictis is found in western Madagascar within the regions known to the Malagasy as 'Menabe central' and 'Menabe sud' and referred to in this text as central and southern Menabe. Central Menabe extends from south of the Tsiribihina River to north of the Morondava River while southern Menabe extends from south of the Morondava River to north of the Mangoky River (Fig. 1). There are two currently recognised subspecies, *M. d. decemlineata* and *M. d. lineata*. The latter is only known from a single immature specimen (Gray, 1848) from an unspecified locality in Madagascar. Although the assumption is that *M. d. lineata* is very rare, perhaps occurring in the Toliara region of southwestern Madagascar, there is no evidence to date to support this (Hawkins *et al.*, 2000). All knowledge of this species is from *M. d. decemlineata* that exists in central and southern Menabe in what are believed to be two distinct sub-populations (Hawkins *et al.* 2000).

Narrow-striped Mongoose Mungotictis decemlineata.

The current known status and distribution of *Mungotictis* is based on village surveys and live-trapping studies conducted in central and southern Menabe (S. Goodman *in litt.*, 2002; Razafimanantsoa, 2003; Woolaver *et al., in prep).* The most recent estimate for central Menabe was between ca. 2,000 and 3,400 mature adults in an area of 900 km^2 (Woolaver *et al., in prep).* Animals within this region were distributed throughout the largest area of connected forest in the west (Fig. 1) but were absent in the smaller forest fragments to the east. In southern Menabe, the population was estimated at between c. 6,400 and 8,650 mature adults within an area of 1,871 km^2 (Woolaver *et al., in prep).* Villagers reported the presence of *Mungotictis* in most of the fragmented forest throughout southern Menabe (Fig. 1), with animals being rarer in the smaller forest fragments in the east. Of considerable interest is a report that *Mungotictis* may be found in the forest immediately south of the Mangoky River (Woolaver *et al., in prep).* This represents the first evidence of the existence of *Mungotictis* south of the Mangoky River, and suggests that knowledge of the world distribution is still not complete.

Threats and recommendations

The rapid loss and fragmentation of forest habitat is the most immediate threat to the survival of *Mungotictis*. *Mungotictis* was found to be rare or nonexistent in isolated fragments of forest throughout the Menabe region (Woolaver *et al., in prep*). In both central and southern Menabe deforestation is occurring at a rapid rate, and will continue to decrease the already limited range of this species. Conservation organisations must increase co-operative

efforts with local villages to reduce the rate of slash-and-burn agriculture of the remaining dry deciduous forest of the Menabe.

Commercial cutting, in addition to modifying the structure and composition of the natural forest (Deleporte *et al.*, 1996), may be having an impact on the surrounding forest that extends beyond the immediate period and locality of commercial activity. In particular, the building of new roads increases the level of human disturbance and accelerates illegal cutting within the surrounding forest, particularly by non-local villagers requiring trees for construction and the building of pirogues. An increase in human activity brings with it an increase in activity by roaming domestic dogs which are suspected to have had a significant negative impact on other terrestrial endemics in the Menabe region, including the Malagasy Giant Jumping Rat *Hypogeomys antimena* (Sommer *et al.*, 2002). Domestic dogs represent a potential source of predation on *Mungotictis* and an evaluation of their impact should be a priority. Of further concern is a report that *Mungotictis* is being hunted for food in southern Menabe (Goodman & Raselimanana, 2003) which would increase the rate of decline. In order for *Mungotictis* to survive it will require areas which are properly protected from commercial cutting and unregulated use by local and non-local villagers.

More information is still required on the status of this species in southern Menabe. Research should be carried out to determine more precise population estimates and trends of *Mungotictis* in the remaining forest fragments of southern Menabe. Emphasis should be placed on determining the extent of the threat posed by hunting of *Mungotictis* for food.

The mystery still remains regarding the full distribution and taxonomic status of *Mungotictis*, in particular whether *M.d. lineata* is a distinct taxonomic unit and, if so, if its range is south of the Mangoky River. If this population-subspecies indeed exists, and is facing pressures similar to those of *M. d. decemlineata* in the Menabe, then it may be at an even greater risk of extinction. It is considered critical that research be carried out to determine if such a population exists.

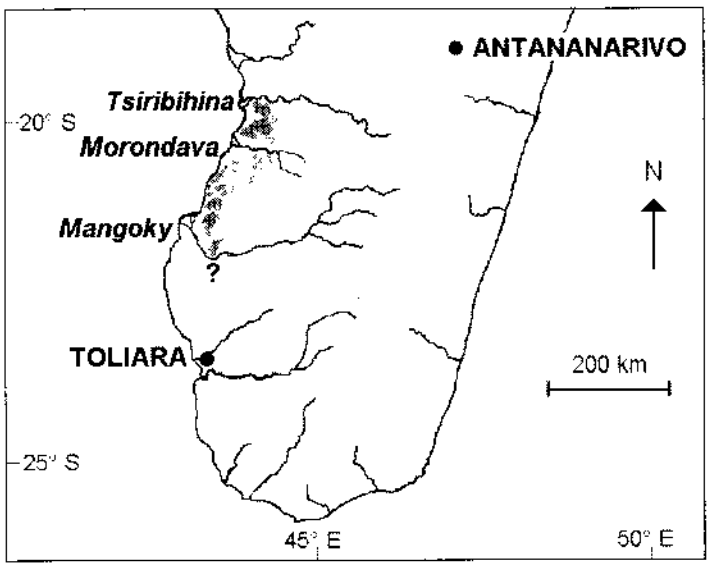

Fig. 1. Map of southern Madagascar showing the current known distribution of *Mungotictis decemlineata* in grey. Names of rivers are italicised. Central Menabe extends from south of the Tsiribihina River to north of the Morondava River. Southern Menabe extends from south of the Morondava River to north of the Mangoky River. The question mark refers to villager reports of *Mungotictis* south of the Mangoky River in 2002 (Woolaver *et al., in prep*).

IUCN classification

In 2002, the total population of *Mungotictis decemlineata* was estimated at <10,000 mature individuals (IUCN, 2002). Recent field research estimated that numbers may be as low as 2,000 mature individuals in central Menabe and 6,400 in southern Menabe (Woolaver *et al., in prep*). This supports the IUCN estimate of <10,000 but the estimate could be refined downward to <8,500. The species extent of occurrence and the quality of the forest in which it lives continue to decline rapidly.

Mungotictis decemlineata is currently classified as Endangered based on criterion B1+2bc from the 1994 IUCN guidelines (IUCN, 1994). The most recent research estimated a larger area of occupancy and extent of occurrence than had been previously thought (Woolaver *et al., in prep*). The new estimated extent of occurrence (central Menabe + southern Menabe = 10,253 km^2), and an inferred further decline of extent of occurrence, area of occupancy, habitat quality, and number of mature individuals qualifies for criterion B1b (i,ii,iii,iv) at the Vulnerable level using the more recent IUCN guidelines from 2001. The population estimate of ca. 8,500 mature individuals qualifies for C1 at the Vulnerable level.

Arguably, this suggests that *Mungotictis* no longer merits the criterion B1+2bc at the Endangered level. However, the estimates of extent of occurrence and population size in southern Menabe are tentative and liberal (Woolaver *et al. in prep*). It is very likely that a more thorough study of this population may refine the species' extent of occurrence to <5,000 km^2 triggering criteria B1b (i,ii,iii,iv) at the Endangered level. In addition, the high rate of forest loss in the Menabe, the unknown impact of hunting on this species in southern Menabe, and the uncertainty of the status of *M. d. lineata* are reasons against any downlisting. The most recent assessment of Malagasy Carnivora using RAMAS Red List software re-classified *Mungotictis decemlineata* as Critically Endangered (Dollar, 2000).

Therefore, the authors strongly recommend that *Mungotictis decemlineata* remain as Endangered until more is known about the status of populations south of the Morondava and Mangoky Rivers.

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Throat patch variability on Cretan Beech Martens

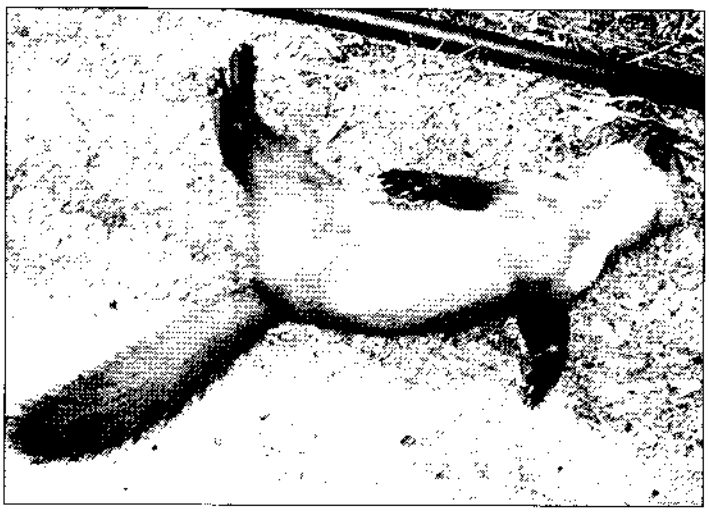
Whilst on route to the north coast, along the main road from Paleochora, western Crete, I found a freshly killed Beech Marten *Martes foina* on the roadside. (North of Kantanos near Floria on the 9th of June 2003).

Upon examination of the animal I was surprised at the large size of its throat patch. All three, "over the years" versions of the popular Collins field guides, to the mammals of Europe, indicate that the Cretan Beech Marten, *Martes foina bunites*, has only a small throat marking. Van Der Brink (1967) states that Beech Martens found on Crete have no white patch or only a very small one, while Macdonald & Barrett (1993) describe that population as having only a small greyish patch. Corbet & Ovenden (1980) make a similar claim.

The specimen found near Floria, as the photograph shows, had a large, white patch similar to that described by Macdonald & Barrett (1993) for the continental European Beech Marten (i.e. pure white or greyish throat bib divided by a dark stripe into left and right parts). Approximately four kilometres on near Mesavlia I found a second dead marten. That animal, obviously smaller than the first, also had a large white bib.

Hence, contrary to what is indicated by the field guides, these observations suggest that Beech Martens on Crete have a variety of throat patterns. Schreiber (1999) confirms this, describing variability as the most conspicuous distinguishing feature of *M. f. bunites*. In addition, another variation is given for this race of a throat patch reduced to two white lateral stripes.

Schreiber (1999) also states that the throat patch size of the Cretan Beech Marten hardly ever reaches the extent observed in the nominate race, *Martes foina foina*. This suggests that the specimens found near Floria were notably unusual.



Beech Marten road kill found near Floria, Crete.

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