ZOOLOGICAL NEWS | NOTÍCIAS ZOOLÓGICAS

No. 1 - MARCH | MARÇO de 2013

Sociedade Caboverdiana de Zoologia

MONKEYS ATTACK CROPS | OS MACACOS A ATACAR CULTIVOS

A Nação of 7 March 2013 reported on the havock caused by monkeys on crops in the area of Sedeguma, Santa Catarina:

Os agricultores de Sedeguma, no concelho de Santa Catarina (no interior de Santiago), dizem-se afrontados com os macacos que estão a atacar os seus cultivos. Nem a delegação de Ministério do Desenvolvimento do Rural (MDR) diz ter solução para combater aqueles primatas. Segundo o agricultor António Mendes 'Cunta', 77 anos, os macacos estão a devastar os cultivos, o que tem desencorajado muitos agricultores, uma vez que as práticas tradicionais que afugentavam os macacos já não surtem efeito. "Antigamente colocávamos espantalhos, deitávamos óleo queimado, peixe podre e outros produtos com mau cheiro nas zonas de cultivo para afastar os macacos, mas isso agora não surte efeito. As crianças que no passado davam alguma ajuda para afugentar esses bichos, hoje em dia estão todos nas escolas". Conforme 'Cunta', o vale de Sedeguma era outrora uma zona habitada, mas devido ao seu isolamento, por falta de estrada de acesso, muitos moradores mudaram-se paras as comunidades vizinhas, nomeadamente Vassoura, Viúva e Nhagar, deixando o campo aberto para os macacos.

De acordo com o técnico do MDR em Santa Catarina, Domingos Alves, a Delegação não dispõe de meios para combater os macacos. "O método eficaz para abater os macacos é através de tiro mas não temos autorização para isso", afirma. O motivo de queixa sobre invasão dos macacos em Santa Catarina não se resume a Seduguma. Também agricultores de Tabugal, Engenhos e Mato Sancho queixam-se do mesmo mal. Os macacos andam a comer mandioca, batata, cana, fruta e tudo que mais que encontram pelo caminho.

Asked for further information, Silvino Monteiro, journalist of *A Nação*, told SCVZ: "O Ministério do Desenvolvimento Rural diz que não pode matar os macacos com pesticidas porque e uma especie endemica que deve ser preservada." In fact, there is nothing endemic about the monkeys in Cape Verde, which were imported – possibly as early as the late 15th century – from continental Africa. Conflicts between monkeys and agriculture have a long history in Cape Verde (see Hazevoet & Masseti, *Zoologia Caboverdiana* 2: 12-24, 2011). In any case, the use of pesticides in order to kill monkeys should be completely out of the question under any circumstance, as this would carry great risks of effecting other organisms (particularly scavenging birds, such as *Neophron, Milvus* and possibly *Buteo*), some of which are indeed endemic and already highly threatened.

On 26 March 2013, Osvaldo Almada, SCVZ correspondent in the Santa Catarina region, visited the area and reported the following: "Durante uma pequena excursão pelo monte de Achada Gomes, notei algo que poderá estar ligado à invasão dos macacos. Em Achada Carapate, no

planalto sobre a Ribeira de Seduguma, as autoridades locais estão a constriuir o aterro sanitário de Santa Catarina. Neste momento estão a efetuar as escavações e existem máquinas e camiões em circulação no local. O local do aterro fica logo acima das escarpas onde os macacos habitam, esta proximidade poderá perturbar os macacos com o barulho constante das máquinas e as vibrações causadas. Tal facto poderá fazer com que estes, abandonem o seu lugar de repouso e se aproximem mais dos povoados e das plantações. Nos últimos anos, Cabo Verde tem experimentado um forte crescimento a nível de infra-estruturação do país, as populações de macacos estão fortemente ameaçadas, pois, são obrigadas a partirem para outros lugares. Tenho vários relatos de macacos a atravessarem a estrada e a invadirem escolas (Picos)."

To be continued | A continuar.

RECENT PAPERS ON CAPE VERDE ZOOLOGY | ARTIGOS RECENTES SOBRE ZOOLOGIA CABOVERDIANA

In the following, papers on Cape Verde zoology published in **2012**, as well as those published **up to March 2013**, are listed. Should you know of any omissions in this listing, please let us know. We also appreciate receiving copies of your latest publications for inclusion in future editions. Please contact cjhazevoet at gmail.com or rui.freitas at docente.unicv.edu.cv

Satellite tracking derived insights into migration and foraging strategies of male loggerhead turtles in the eastern Atlantic. Nuria Varo-Cruz, Lucy A. Hawkes, Daniel Cejudo, Pedro López, Michael S. Coyne, Brendan J. Godley, Luis Felipe López-Jurado, 2013, Journal of Experimental Marine Biology and Ecology 443: 143-140; http://dx.doi.org/10.1016/j.jembe.2013.02.046

ABSTRACT In recent years, information about the movements and timing of migration by male sea turtles has begun to be unraveled. Here, we present the first satellite tracking of male loggerhead sea turtles (*Caretta caretta*) in the eastern Atlantic. Satellite linked transmitters were attached to five adult males, captured in the near shore waters off Boavista, Republic of Cape Verde. This archipelago hosts the single most important breeding site of loggerhead turtles in the eastern Atlantic. Animals were tracked for periods ranging between 48 and 537 days, including a probable annual remigration to the vicinity of the nesting ground for one turtle. Males showed a variety of movement patterns both during and after the breeding season. Of three males that transmitted for 85, 329 and 537 days, two (the smallest) migrated east and remained in oceanic waters for the tracking period and another (larger turtle) migrated 810 km northeast, to neritic waters off the coast of Mauritania, Western Africa. Results suggest males may show the same size-linked dichotomy in migratory strategies, as has been shown for females from this population.

Foraging dichotomy in loggerhead sea turtles *Caretta caretta* off northwestern Africa. E. Eder, A. Ceballos, S. Martins, H. Pérez García, I. Marín, A. Marco & L. Cardona**, 2012,** Marine Ecology Progress Series 470: 113-122; http://dx.doi.org/10.3354/meps10018

ABSTRACT A foraging dichotomy among sexually mature females has been reported for several populations of loggerhead sea turtles, where large adult females forage primarily in neritic habitats and smaller adult females forage primarily in oceanic habitats. The prevalence of neritic foragers has been considered a consequence of much higher food availability in neritic foraging grounds than in oceanic habitats. However, previous satellite tracking suggested that oceanic foraging is prevalent among the adult females in Cape Verde. We used stable isotopes to assess the actual proportion of neritic and oceanic females in this population and used carapace length, clutch size and egg volume to assess differences in their fitness. Stable isotope ratios confirm that the adult female population in Cape Verde is dominated by oceanic foragers that avoid the oligotrophic region west of the archipelago. The proportion of oceanic and neritic foragers did not depart significantly from that expected if turtles settled opportunistically between the archipelago and mainland Africa at the end of their developmental migration, without any preference for the continental shelf. However, adult neritic foragers had a higher fitness, as revealed by larger carapace length and clutch size. Furthermore, they were older than adult oceanic foragers, thus indicating that some animals shifted from oceanic to neritic habitats with age, most likely due to a higher accumulated probability of detecting the African shelf over time. In conclusion, most of the females nesting in Cape Verde do not select the best available foraging grounds, but settle opportunistically in the highly productive area between the archipelago and Africa when they return from their developmental migration.

Review of the distribution and conservation status of the terrestrial reptiles of the Cape Verde Islands. Raquel Vasconcelos, José Carlos Brito, Salvador Carranza & D. James Harris, 2013, Oryx 47 (1): 77-87; http://dx.doi.org/10.1017/S0030605311001438

ABSTRACT Cape Verde has a higher number of reptile taxa and endemics than any of the five archipelagos in the Macaronesian region. Mapping the precise distributions and assessing the conservation status of reptiles is the first step towards effective conservation. Presence/absence and abundance data were gathered from extensive fieldwork and post-1980 literature. Evaluation of conservation status was considered at specific and subspecific levels, following IUCN Red List criteria and using RAMAS. Fieldwork confirmed the occurrence of 34 of 37 previously recorded taxa (31 native, three exotic). One taxon continues to be considered Extinct. Three broad distribution and rarity patterns were identified: widespread and abundant taxa occurring on $\geq$ 2 islands/islets, widespread or abundant taxa restricted to one island, and rare or limited range taxa occurring on small areas of islands or islets. More than a third of taxa have areas of occupancy < 20 km^2 and extents of occurrence < 100 km^2. Geckos are rarer than skinks because of their high habitat specialization, with 58% occurring on only one island/islet. About half of all taxa are potentially threatened, twice the proportion of those in the Canary Islands, a difference that could be explained by the smaller area and greater aridity of the Cape Verde islands. The criterion used for most threat categorizations is geographical range, and the most pervasive threats are natural disasters, intrinsic factors of the species and introduced species. The importance of applying conservation status at the subspecific level to island endemics is emphasized. Several conservation measures are proposed, including optimized design of protected areas.

Identifying priority areas for island endemics using genetic versus specific diversity – The case of terrestrial reptiles of the Cape Verde Islands. Raquel Vasconcelos, José Carlos Brito, Sílvia B. Carvalho, Salvador Carranza & D. James Harris, 2012, Biological Conservation 153: 276-286; http://dx.doi.org/10.1016/j.biocon.2012.04.020

ABSTRACT Genetic diversity is critical for conservation of endemic populations. It enhances adaptation to rapid environmental changes and persistence over evolutionary time-scales. In small and isolated populations, such as on islands, this is even more relevant. Nevertheless, few studies regarding the establishment of protected areas (PAs) on islands have taken genetic diversity into account. The Cape Verde Islands are in a biodiversity hotspot and present to resource planners unique problems and possibilities, hence are a good case study. This work primarily aims to compare targeting evolutionary significant units (ESUs) versus species in reserve selection algorithms for the conservation of the endemic Cape Verdean reptile diversity by assessing the PAs network adequacy, identifying its gaps, and optimizing it based on 'realistic' (considering areas inside PAs with lower cost) and 'ideal' (considering all non-humanized areas with higher potential for conservation) cost scenarios. Results clearly indicate that analyses targeting ESUs are more effective in the protection of genetic diversity and less costly in terms of selected area, in total and inside PAs. Results also indicate that most ESUs and species are insufficiently protected and that extra PAs are needed on most islands to reach conservation targets. Surprisingly, the total area selected in 'ideal' and 'realistic' prioritization scenarios are identical on most islands both for analyses targeting ESUs or species. Therefore the 'realistic' scenario should be largely followed. The work provides an innovative methodological framework for supporting the use of genetic diversity in reserve design and its results should assist in local-scale conservation planning.

An integrative taxonomic revision of the Tarentola geckos (Squamata, Phyllodactylidae) of the Cape Verde Islands. Raquel Vasconcelos, Ana Perera, Philippe Geniez, D. James Harris & Salvador Carranza, 2012, Zoological Journal of the Linnean Society 164: 328-360; http://dx.doi.org/10.1111/j.1096-3642.2011.00768.x

ABSTRACT Recent phylogeographical analyses using mitochondrial DNA (mtDNA) sequences indicate that the *Tarentola* geckos from the Cape Verde archipelago originated from a propagule that dispersed from the Canary Islands approximately 7.7 Mya and that underwent a fast evolutionary radiation. Molecular analyses carried out to date clearly show some incongruences with the current taxonomy of *Tarentola* from the Cape Verde Islands, with some species being paraphyletic or polyphyletic, and several independently evolving lineages needing formal taxonomic recognition. The aim of this study was to clarify the systematics of this group to unravel its taxonomy by applying an integrative approach based on information from three independent sources: mtDNA, nuclear genes, and morphology. As a result of this taxonomic revision, two novel species for the islands of S. Nicolau and Fogo are described and eight subspecies are upgraded to species level. Moreover, an identification key for the genus *Tarentola* from the Cape Verde archipelago is presented. This study reconciles taxonomy and phylogeny in this group, provides a better understanding of diversity patterns, new insights on evolutionary

hypotheses, and supports the basic framework for the future management and conservation of this unique reptile radiation.

Las trágicas crónicas de la lisa gigante de Cabo Verde. José Antonio Mateo, 2012, Makaronesia, Boletín de la Asociación Amigos del Museo de la Naturaleza y el Hombre (Santa Cruz de Tenerife), No. 14: 2-14.

[No abstract] An illustrated account on the history of discovery, description, distribution and extinction of the Cape Verde giant skink *Chioninia* (formerly *Macroscincus*) *coctei.*

Rainfall-related population growth and adult sex ratio change in the Critically Endangered Raso lark (*Alauda razae*). M. de L. Brooke, T. P. Flower, E. M. Campbell, M. C. Mainwaring, S. Davies & J. A. Welbergen, 2012, Animal Conservation 15 (5): 466-471; http://dx.doi.org/10.1111/j.1469-1795.2012.00535.x

ABSTRACT Active conservation has often been successful in reversing or arresting population declines of endangered species. However, examples of Critically Endangered species recovering in the absence of human intervention are extremely rare. We censused the Raso lark, a single-island endemic of the Cape Verdes archipelago, annually from 2001 to 2010. Between 2004 and 2010, the world population grew from 65 to 470 individuals. This remarkable increase occurred without conservation intervention, but correlated strongly and positively with rainfall. Because of this population increase, the mean age of birds reduced and the population shifted from male skew, a consequence of higher male survival, towards one where the sexes were more equally represented. This study illustrates the dramatic effect that natural changes in climatic conditions may have on the recovery of endangered species. However, the current favourable situation may not persist, and we suggest a translocation to another Cape Verdean island be urgently considered. We conclude that temporal trends in the population dynamics of endangered populations need to be considered when planning and implementing species recovery plans.

NOTE ADDED IN PROOF While this paper was in review, further fieldwork was conducted on Raso in November 2011. Using the same protocol as described in the Methods section, the Raso lark population had increased threefold from the 2010 level of 470 individuals to 1490 in 2011. Thus, between 2004 and 2011, the population increased from 65 to 1490. To the best of our knowledge, no other Critically Endangered bird has shown a twenty-fold increase in numbers in seven years.

***Sparisoma choati*, a new species of parrotfish (Labridae: Scarinae) from the tropical eastern Atlantic.** Luiz A. Rocha, Alberto Brito & D. Ross Robertson, 2012, Zootaxa 3152: 61-67.

ABSTRACT The parrotfish *Sparisoma choati* is described from the tropical eastern Atlantic Ocean. It is genetically unique and also differs from its congeners by coloration as follows: initial phase individuals and females greyish brown to greyish red, with chin and belly paler and

reddish brown scales irregularly distributed along flanks resulting in a general mottled appearance; terminal phase individuals with brownish red head and upper half of anterior two-thirds of body, ventral portion of central third of body bright yellow-green, posterior third of body dark greenish gray and dark spot on upper fifth of pectoral fin base. The new species is found in rocky reefs along the coast and oceanic islands off West Africa, from Cape Verde and Senegal south to the islands of São Tomé and Príncipe and Angola.

RESUMO O peixe-papagaio *Sparisoma choati* é descrito do Oceano Atlântico tropical oriental. Ele é geneticamente único e também difere de seus congêneres na coloração da seguinte forma: indivíduos em fase inicial e fêmeas marrom acinzentados a ver- melho acinzentados, com parte inferior da cabeça e ventre mais pálidos e escamas marrom avermelhadas irregularmente distribuídas ao logo dos flancos resultando num padrão geral de aparência de mosaico; indivíduos em fase terminal com cabeça e metade superior dos dois terços anteriores do corpo vermelho amarronzada, porção ventral do terço central do corpo verde-amarelo brilhante, terço posterior do corpo cinza esverdeado escuro e mancha escura no quinto superior da base da nadadeira peitoral. A nova espécie é encontrada em recifes rochosos ao longo da costa e ilhas oceânicas da África Ocidental, do Cabo Verde e Senegal às ilhas de São Tomé e Príncipe e Angola.

A new species of *Liopropoma* Gill, 1862 from the Cape Verde Islands, Eastern Atlantic (Teleostei, Perciformes, Serranidae). Peter Wirtz & Ulrich K. Schliewen, 2012, Spixiana 35 (1): 149-154.

ABSTRACT *Liopropoma emanueli* spec. nov. is described on the basis of two specimens from the Cape Verde Islands. The species is most similar to an undescribed *Liopropoma* from São Tomé Island and an undescribed *Liopropoma* from Brazil. It differs from all described *Liopropoma* species in having the dorsal fin clearly divided, more than 50 lateral line scales, and in having numerous, thin yellow lines on a pink body.

First record of freshwater fish on the Cape Verdean archipelago. Kay Lucek & Mélissa Lemoine, 2012, African Zoology 47 (2): 341-344; http://dx.doi.org/10.3377/004.047.0214

ABSTRACT The Cape Verdean islands form a distinct aquatic fresh- water ecoregion characterized mainly by temporal waterbodies with an adapted invertebrate community. Freshwater fish were not previously recorded from the archipelago. During a non-exhaustive survey of freshwater bodies on five islands of the archipelago, the first presence of a freshwater fish was recorded. Using barcoding sequences, the species was identified as the guppy (*Poecilia reticulata*), a highly invasive species alien to the Cape Verdean Islands.

A comparison of the fish assemblages on natural and artificial reefs off Sal Island (Cape Verde). Miguel N. Santos, Miguel T. Oliveira & João Cúrdia, 2013, Journal of the Marine Biological Asssociation of the United Kingdom 93 (2): 437-452; http://dx.doi.org/10.1017/S0025315412001051

ABSTRACT Tourism is a growing activity in Cape Verde, which can lead to more intensive and uncontrolled fishing and diving activities, affecting the quality of marine habitats. To mitigate this biodiversity problem, a private diving operator, supported by the local authorities, decided to deploy the first artificial reefs (ARs) in the archipelago just off Santa Maria Bay (Sal Island). To evaluate the ARs capacity to promote marine fish biodiversity in Santa Maria Bay, the fish assemblages were compared to those from nearby natural reefs (NRs), located at the same depth (10 and 28 m depth), by means of visual census. All study sites were surveyed by visual census in August 2009. A total of 64 species were recorded, mostly consisting of sedentary and/or benthophagous demersal species, followed by highly-sedentary benthic cryptic species. 'Tchuklassa' NR showed the highest species richness (58 species), while the lowest was recorded at 'Santo Antão' AR (48 species). An overall positive relationship was observed between habitat rugosity and mean species richness. The results showed a high percentage of common species on both reef types. Higher mean values of community descriptors (number of species, Shannon–Weaver diversity index, Simpson dominance index and equitability) and fish density were found on the ARs, with slightly higher densities recorded on the deeper reefs. These results suggest that ARs can have an important role promoting the local fish biodiversity and supporting local sustainable development of diving tourism.

Mysids associated with sea anemones from the tropical Atlantic: descriptions of *Ischiomysis* new genus, and two new species in this taxon (Mysida, Mysidae, Heteromysinae). Karl J. Wittmann, 2013, Crustaceana 86 (4): 487-506; http://dx.doi.org/10.1163/15685403-00003166

ABSTRACT The males of *Ischiomysis* gen. nov. are unique among the currently known genera of the order Mysida by peculiar modifications of the ischium and praeischium of the eighth thoracic endopod. The type species, *I. telmatactiphila* sp. nov., forms compact aggregations above the oral disc of the club-tipped sea anemone *Telmatactis cricoides* from the island of São Tomé in the Gulf of Guinea. Less compact aggregations are formed by *I. peterwirtzi* sp. nov. from the island of São Vicente in the Cape Verde archipelago. Such looser aggregations were found in marine (micro)caves, wherein they extended over the anemones and adjacent rock recesses. An undetermined, visually similar mysid with similar distribution above the oral disc is documented by a colour photograph from Trindade, a small oceanic island in the tropical south-west Atlantic. Potential morphological relationships between the new genus and certain species of Heteromysis from the Caribbean and the Indian Ocean are discussed.

Trans-oceanic host dispersal explains high seabird tick diversity on Cape Verde Islands. E. Gómez-Díaz, J.A. Morris-Pocock, J. González-Solís & K.D. McCoy, 2012, Biology Letters 8: 616-619; http://dx.doi.org/10.1098/rsbl.2012.0179

ABSTRACT Parasites represent ideal models for unravelling biogeographic patterns and mechanisms of diversification on islands. Both host-mediated dispersal and within-island adaptation can shape parasite island assemblages. In this study, we examined patterns of genetic diversity and structure of *Ornithodoros* seabird ticks within the Cape Verde archipelago in relation to their global phylogeography. Contrary to expectations, ticks from multiple,

geographically distant clades mixed within the archipelago. Trans-oceanic colonization via host movements probably explains high local tick diversity, contrasting with previous research that suggests little large-scale dispersal in these birds. Although host specificity was not obvious at a global scale, host-associated genetic structure was found within Cape Verde colonies, indicating that post-colonization adaptation to specific hosts probably occurs. These results highlight the role of host metapopulation dynamics in the evolutionary ecology and epidemiology of avian parasites and pathogens.

Nuevas aportaciones al conocimiento de la fauna invertebrada de la isla de Santa Luzia, Cabo Verde. Rafael García & Félix M. Medina, 2012, Revista de la Academia Canaria de Ciencias 24: 197-200.

ABSTRACT The status and distribution of four species of terrestrial invertebrates from the Cape Verde Islands are considered; most of these species (*Macroscytus brunneus*, *Sphaericus echinatus*, *Mezium americanum*) are mentioned for the first time for Santa Luzia island, and one (*Oxycarenus lavaterae*) is a new record for the archipelago.

Libellen auf Boa Vista, Kapverdischen Inseln (Odonata). Michael Bußmann, 2012, Libellula 31: 61-75.

ABSTRACT Dragonfly records from the island of Boa Vista, Cape Verde (Odonata) – During a stay from 15 to 29-xii-2010, seven dragonfly species were recorded: *Anax ephippiger*, *A. imperator*, *Crocothemis erythraea*, *Orthetrum trinacria*, *Pantala flavescens*, *Sympetrum fonscolombii*, and *Trithemis annulata*, most spp. both as adults and as exuviae. *Anax imperator* and *S. fonscolombii* were recorded on Boa Vista for the first time.

Zur Kenntnis der Schmetterlingshafte, Florfliegen und Ameisenjungfern (Neuropterida: Ascalaphidae, Chrysopidae, Myrmeleonidae) der Kapverden (Cabo Verde). Eyjolf Aistleitner & Herbert Holzel, 2012, Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen 64: 119-124.

ABSTRACT From several journeys by the first author to the Cape Verde islands between 1998 and 2007, 74 faunistic data of 18 species of Ascalaphidae, Chrysopidae and Myrmeleonidae are presented. Some taxonomic questions are discussed. First species records are from four islands: *Brinckochrysa plagata* (Navás, 1929), *Mallada desjardinsi* (Navás, 1911), *Creoleon cecconinus* Navás, 1932, and *Myrmeleon amicus* Hölzel & Ohm, 1983 from Ilha da Boavista; *Italochrysa lobini* Hölzel & Ohm, 1982, *Dichochrysa nicolaina* (Navás, 1929), *Dichochrysa nigra* (McLachlan, 1869), and *Suarius piresi* Hölzel & Ohm, 1982 from Ilha Brava; *Chrysoperla pudica* (Navás, 1910), *Italochrysa lobini* Hölzel & Ohm, 1982, *Creoleon giganteus* Navás, 1932, *Myrmeleon caliginosus* Hölzel & Ohm, 1983, and *Neuroleon sociorum* Hölzel & Ohm, 1983 from Ilha do Maio; and *Chrysoperla pudica* (Navás, 1910) from Ilha do São Nicolau.

A significant and unappreciated intertidal mytiloidean genus: the biology and functional morphology of *Brachidontes puniceus* (Bivalvia: Mytilidae) from the Cape Verde Islands.
Brian Morton, 2012, African Journal of Marine Science 34 (1): 71-80; http://dx.doi.org/10.2989/1814232X.2012.673285

ABSTRACT *Brachidontes puniceus* (Gmelin 1791) occurs on all the islands of the Cape Verde archipelago and along the West African coast from Mauritania to Ghana. The species is morphologically, in terms of its acutely heteromyarian form, strong byssal attachment, stout ligament, thickened shell ornamented with obliquely radial ribs, marginal denticles and strongly developed hinge teeth, intimately adapted to life in the tropical rocky intertidal. Internally, *B. puniceus* has large ctenidia and tiny labial palps that enhance suspension feeding in, generally, nutrient-deficient tropical waters. As with its congeners distributed throughout the tropics and subtropics globally, *B. puniceus* is probably also physiologically and reproductively opportunistic such that it can readily colonise hard intertidal substrata. In comparison with boreal mytilids, notably species of *Mytilus*, the widely successful, abundant and diverse tropical species of *Brachidontes* remain poorly studied and understood, anatomically and physiologically largely uninvestigated and ecologically unappreciated. This study provides the basic information necessary to allow this situation to be rectified.