

D. TRINIDAD AND TOBAGO: STATUS REPORT ON KEY ANIMAL SPECIES

By M. ALKINS-KOO AND S. SOOMAI

D.1 Introduction

The Interim Technical Committee on Biological Diversity and Genetic Resources decided at its meeting of 17 July 1990 to initiate one of its objectives by compiling a status report on key species of animals for Trinidad and Tobago. A graduate student was hired for four months to collate the available information and conduct the necessary interviews forming the basis of the report. The format of the report is structured upon a questionnaire from the Commonwealth Science Council which refers to potentially valuable plants. Some difficulty was experienced in translating individual questions into the context of animals and as a result, the general headings for sections of the questionnaire were used as the basis for this report instead of attempting to answer specific questions.

In addition, the original CSC questionnaire refers largely to under-exploited species of potential economic importance. However, it is the authors' opinion that many local animals have a high potential economic importance for sustained exploitation/production, e.g. aquaculture of local fish species or ranching of game mammals, but these same species are at present over-exploited in the wild. This lead to some confusion as to exactly which species should be considered for the lists. In order to make the list as useful as possible in terms of deterring *valuable* animal species, it was decided to consider all local species of potential importance whether under- or over-exploited.

D.2 Survey and documentation of potentially valuable animals

The vertebrate fauna of Trinidad and Tobago is comparatively well known with several accounts of species available. The knowledge of the invertebrates, however, is patchy and dependent upon the economic importance of the group (e.g. veterinary and crop pests) or their aesthetic/collection value (Mollusca, Lepidoptera).

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Several major libraries and collection of identified reference specimens exist (Table 1). The subject of maintenance and co-ordination of reference collections has been dealt with separately and in more detail by the Subcommittee of the Interim Technical Committee chaired by Dr P. Baker. The role of reference collections in the assessment of local faunas is invaluable and must be given more attention in future. Reference collections for certain groups may exist for which supporting literature (checklists, keys or catalogues) are lacking, thus making them the only source available for assessment of these groups. Conversely, for taxonomically difficult groups, literature may be available but in the absence of a collection, is of limited value for the non-specialist.

Table 1 Institutions housing libraries or reference collections which serve as source material on the fauna of Trinidad and Tobago. Details of the areas covered by each institution are given.

Institution	Library	Reference Collection
Caribbean Epidemiology Centre (CAREC) Port of Spain	Medical/veterinary entomology	Mammals, birds, insect vectors
Central Experimental Station (CES) Centeno	Crop entomology	
Emperor Valley Zoo Port of Spain	General	Living collection
Institute of Marine Affairs (IMA) Chaguaramas	Marine	Marine
International Institute for Biological Control (IIBC) Curepe	Pests, biological agents (access to CAB database)	Pests biocontrol agents
The National Museum Port of Spain		Limited
Pointe-a-Pierre Wildfowl Trust Pointe-a-Pierre	Limited	Peter Percharde mollusc collection
The University of the West Indies St Augustine	General (Main Library Zoology Department)	General (Zoology Dept)
Wildlife Section, Forestry Division St Joseph	Terrestrial wildlife and waterfowl	Limited (mammals, birds)

Source references available for the most important groups of animals are given in Table 2. Attempts to update information contained in the references is continuing at various research institutions. The Department of Zoology, University of the West

Table 2 Sources for the identification of animals of importance for Trinidad and Tobago.

Taxon	References
Mammals	Goodwin & Greenhall (1961, 1964) [keys to bats], Alkins (1979) [annotated list of species], Boos (1986) [checklist]
Birds	Bond (1960) [Caribbean], Herklots (1961) [Trinidad & Tobago], ffrench (1980, 1988) [Trinidad & Tobago]
Reptiles	Underwood (1962) [all reptiles], Emsley (1977) [snakes of Trinidad & Tobago]
Amphibia	Kenny (1969, 1971, 1977) [larval and adult keys]
Fish	Price (1955) [freshwater], Boeseman (1960, 1964) [freshwater, keys], Fischer (1978) [marine fish of fisheries importance], Randall (1968) [Caribbean marine fishes], Hoese & Moore (1977) [Gulf of Mexico marine fishes]
Insects	Many monographs exist for specific groups, Pollard & Francis (1989)
Crustacea	Chace (1972) [marine and estuarine shrimps], Chace & Hobbs (1969) [crabs, prawns], Fischer (1978) [crustacea of fisheries importance], Stonley (1970) [marine, estuarine, freshwater crabs]
Mollusca	Bacon (1975) [mussels], Baboolal & Johnatty (1982) [chitons], Warmke & Abbot (1961) [marine gastropods, bivalves], Humfrey (1975) [marine gastropods, bivalves]
<i>see also</i>	Emsley (1977); ffrench (1980, 1984); Kenny & Bacon (1981), Price (1955), Thelen & Faizool (1980)

Indies, produces an Occasional Paper series which attempts, *inter alia*, to produce faunal accounts, e.g. Cock's (1979) catalogue of the Hesperidae, Michalski's (1988) catalogue and keys to the Odonata. In addition, publications of individual researchers in local or international journals contribute to expansion of knowledge of local faunas (e.g. Alkins-Koo 1990). The Forestry Division, Wildlife Section have produced questionnaires which are distributed to the public and hunters, e.g. James (1981-82, 1982-83) to collect data on game species. A Bibliography is also being compiled by the Wildlife Section.

Annex D.1 is an inventory of the indigenous species of animals, many of which are either of importance in the traditional economy of Trinidad and Tobago or are

considered threatened in status and therefore of value for conservation. Their natural habitats and main areas of distribution as well as traditional uses are given. Bats and native rodents are not included due to inadequate information on their status. It was extremely difficult to isolate the top ten most important species since many more than ten are of economic value or of conservation interest. However, Tables 3 and 4 list the most important species of conservation interest and economic importance respectively for each of the major taxa. No attempt was made to identify ten of the most important species of animals for all taxa.

The value of wild animals is apparent in many different ways (James 1983). The use of these animals for food is of priority importance to social and economic development due to their direct nutritional value in subsistence hunting/gathering and due to income derived from sales of the animals and indirectly from sales of items related to hunting or fishing (Asibey 1984a).

Another very important use of these animals is in recreation or for aesthetics. In recent times the concept of ecotourism has become popular and both local and foreign tourists are attracted to certain natural areas as a result of their component wildlife. Economic benefits are obtained from the sale of equipment or supplies to support photography, birdwatching or art. Income may be derived from accommodation, tours and craft sales and jobs may be created from these and related activities (Ramdial 1980).

The use of animals in the live trade as pets is also important. The prices of some selected song birds on the local market may be exorbitant. As well, there is export of live animals for the international pet trade. Freshwater fish such as the teta and pui pui are exported in the aquarium trade.

Medicinal uses are important in the following ways:

Disease monitoring – howler monkeys are very susceptible to yellow fever and mass deaths of monkeys occur immediately preceding outbreaks in human populations.

Traditional medicine – certain animal products are used, e.g. snake oil for stiff joints; matte fat for rheumatism and arthritis; porcupine quills for toothache. Modern medicine – species of marine invertebrates such as the sponge *Tethya crypta* which occurs in local waters have been found to contain important compounds which may be used against leukaemia, some forms of cancer or viruses. Research is being conducted by the University of the West Indies on the following:

- a) The antiviral component in the tunicate, *Eudistoma olivaceum*, found on the prop roots of mangrove trees in the Caroni Swamp.
- b) Extraction of antitoxin from game animals to enhance the domestic breeding of wild animals.
- c) Extraction of thyroid and other hormones from the reproductive glands of animals which breed easily in captivity, viz. the brocket deer and agouti, to facilitate farming/breeding on a large scale.

Table 3 Key vertebrate species of conservation priority.

Common Name	Scientific Name
Mammals:	
Manatee	<i>Trichechus manatus</i>
Red howler monkey	<i>Alouatta seniculus insularis</i>
Woolly opossum	<i>Caluromys philander trinitatis</i>
Capuchin	<i>Cebus albifrons</i>
Porcupine	<i>Coendu prehensilis longicaudatus</i>
Silky anteater	<i>Cyclope didactylus didactylus</i>
Tayra	<i>Eira barbara trinitatis</i>
Ocelot	<i>Felis pardalis</i>
Otter	<i>Lutra enudris</i>
Crab-eating racoon	<i>Procyon cancrivorus cancrivorus</i>
Birds:	
Pawi	<i>Aburria pipile</i>
Blue and yellow macaw	<i>Ara ararauna</i>
Yellow-headed parrot	<i>Amazona ochrocephala</i>
Red-bellied macaw	<i>Ara manilata</i>
Scarlet ibis	<i>Eudocimus ruber</i>
Tobago picoplat	<i>Sporophila americana</i>
Picoplat	<i>Sporophila intermedia</i>
Robin	<i>Sporophila minuta</i>
Bullfinch	<i>Oryzoborus angolensis</i>
Twa twa	<i>Oryzoborus crassirostris</i>
Moriche oriole	<i>Icterus chryscephalus</i>
Red siskin	<i>Spinus cucullatus</i>
Fulvous whistling duck	<i>Dendrocygna bicolor</i>
Black-bellied whistling duck	<i>Dendrocygna autumnalis</i>
Great blue heron	<i>Ardea herodias</i>
Anhinga	<i>Anhinga anhinga</i>
Blue-winged teal	<i>Anas discors</i>
Limkin	<i>Aramus guarauna</i>
Boat-bellied heron	<i>Cochlearius cochlearius</i>
Pinnated bittern	<i>Botaurus pinnatus</i>
Osprey	<i>Pandion haliaetus</i>
Reptiles:	
Green turtle	<i>Chelonia mydas</i>
Hawksbill turtle	<i>Eretmochelys imbricata</i>
Leatherback turtle	<i>Dermochelys coriacea</i>
Pacific ridley	<i>Lepidochelys olivacea</i>
Yellow-footed morocoy	<i>Geochelone denticulata</i>
Red-footed morocoy	<i>Geochelone carbonaria</i>
Anaconda	<i>Eunectes murinus</i>
Mangrove snake	<i>Liophis cobella</i>
False coral	<i>Erythrolamprus aesculapii ocellatus</i>
Ocellated gecko	<i>Gonatodes ocellatus</i>
Amphibians:	
Golden tree frog	<i>Phyllodytes auratus</i>
Surinam toad	<i>Pipa pipa</i>

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Table 4 Key species of animals which are of potential importance for food and other uses by captive breeding and aquaculture.

Common Name	Scientific Name
Mammals::	
Agouti	<i>Dasyprocta agouti</i>
Deer	<i>Mazama americana trinitatis</i>
Lappe	<i>Agouti paca</i>
Wildhog	<i>Tayassu tayaçu</i>
Tatoo	<i>Dasyus novemcinctus novemcinctus</i>
Manicou	<i>Didelphis marsupialis insularis</i>
Birds:	
Cocrico	<i>Ortalis ruficauda</i>
Seedeaters	<i>Sporophila species</i>
Seed finches	<i>Oryzoborus species</i>
Ducks	<i>Dendrcygn species</i>
Reptiles:	
Common iguana	<i>Iguana iguana</i>
Matte	<i>Tupinambis nigropunctatus</i>
Caiman	<i>Caiman scleops</i>
Galap	<i>Rhinoclemys punctularia</i>
Morocoy	<i>Geochelone species</i>
Fish:	
Cascadu	<i>Hoplosternum littorale</i>
Pui pui	<i>Corydoras aeneus</i>
Teta	<i>Hypostomus robinii</i>
Sword-tailed tetra	<i>Corynopoma riisei</i>
Blue coscorob	<i>Aequidens pulcher</i>
River catfish	<i>Rhamdia quelen</i>
Snook	<i>Centropomus species</i>
Mountain mullet	<i>Agonostomus monticola</i>
Grey mullet	<i>Mugil species</i>
Grey snapper	<i>Lutjanus griseus</i>
Mollusca:	
Mok	<i>Mytella species</i>
Mangrove oyster	<i>Crassostrea rhizophorae</i>
Chip chip	<i>Donax species</i>
Gaudy asaphis	<i>Asaphis deflorata</i>
River conch	<i>Pomacea urceus</i>
Black conch	<i>Melongena melongena</i>
Sea conch	<i>Strombus species</i>
Crustacea:	
Shrimp	<i>Penaeus species</i>
Prawn	<i>Macrobrachium species</i>

Certain ecological functions are also carried out by wild species of animals:

Biological pest control – control of insects by birds and bats, control of rodents, slugs and snails by snakes or birds of prey, are examples of this function. Further, some species may be of value as biocontrol agents in other countries, e.g. the snail *Marisa cornuarietis* is used as a predator of schistosome snail vectors, and many insect species are used as pest predators or parasites.

Environmental sanitation – scavenging of carcasses and other organic material is carried out by mongoose and corbeaux.

Forest regeneration – seed dispersal in tropical forests may be accomplished by animals such as agouti, bats or birds. In some cases preliminary digestion of the seed coat while in the gut of these animals may be necessary in order for successful germination to take place.

Fruit production – pollination of flowers by bats, birds and insects is essential for fruit production and may be critical in commercial production of fruit, e.g. cocoa.

Soil conditioning – degradation of organic material and mixing of soil is done by the activities of a host of soil invertebrates such as earthworms, millipedes and insects.

The distribution of species is well documented (Annex D.1). Various research institutions as well as amateur naturalists have contributed to this exercise. Many species exist in areas under control of the State such as forest reserves, wildlife sanctuaries and nature reserves (Thelen & Faizool 1980; CNPPA 1982; Scott & Carbonell 1986). Some private lands are managed as nature reserves/centres (Reddock 1974). Table 5 lists areas which fall under the above categories of protected area. Legislation establishing these areas include the Forest Reserves Act of 1950, the Conservation of Wildlife Ordinance No. 16 of 1958, and the Marine Preservation and Enhancement Act of 1970. In 1980 a much more extensive system of national protected areas was proposed (Thelen & Faizool 1980) but this has not yet been officially established.

The status of national protected areas is variable with some being adequately managed for their original protective objectives, others are not and are even experiencing severe disruption (Bacon & Ffrench 1972; CNPPA 1982). All of the national reserves need adequate patrols by wardens. The present status of each State protected wildlife sanctuary is dealt with below. The private reserves may be the only areas where wildlife species thrive because of the ability to restrict activities more effectively.

Northern Range: El Tucuche is one of only two localities (the other being El Cierro del Aripo) where the golden tree frog, *Phyllodytes auratus*, occurs. Recent sightings of the species have become rare. Threats include poaching of game species and forest fires.

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Table 5 Existing protected areas in Trinidad and Tobago.

Status	Name of Area
Wildlife sanctuary	Northern Range Valencia Central Range Trinity Hills Southern Watershed Little Tobago Saut D'Eau Soldado Rock Caroni Swamp Kronstadt Island Morne L'Enfer St Giles Islands Bush Bush
National nature reserve	Mt Harris Tamana Hill Melajo Rochard Douglas Brickfield No 1 Brickfield No 2 Brickfield No 3 Blue Basin Mahagual Morne Diablo Long Stretch
Marine restricted area	Buccoo Reef
Private nature reserves/parks	Asa Wright Nature Centre Pointe-a-Pierre Wildfowl Trust Simla Research Station El Naranjo Tropical Gardens Palmiste Estate Savanna Caledonia Estate Oropouche Caves, Brothers' Estate Non Pareil Estate St Marie Estate Christiandora Development Blue Basin Oropouche Lagoon Grafton Estate Bon Accord Lagoon North Coast Reserve Mt Irvine Bay Hotel Bird Sanctuary Buccoo Swamp L'Anse Fourmi Estate Bird of Paradise Inn Kilgwin Lagoon and Swamp

Valencia: This area is home to 50 species of birds which include doves, antbirds, manakins, flycatchers and tanagers. Game animals are also present. Patrol of the area is difficult due to the numerous gravel pits. The area has suffered great losses from poaching, quarrying, timber harvesting, establishment of pine plantations and forest fires.

Central Range: This area includes most of the game animals, red howler and capuchin monkeys. Birds such as manakins, flycatchers, antbirds, trogons, woodpeckers, toucans and the pawi may be seen there. In recent times there has been reforestation with teak thus negatively altering the wildlife habitat. Threats include poaching and forest exploitation.

Trinity Hills: This area contains a high diversity of fauna with game mammals, wild cat and the reptiles are well represented (including the morocoys). Thirty-one species of birds have been recorded including the most reliable record of the pawi. It is one of the few areas where wildlife is still relatively abundant due to its inaccessibility. Disturbances include oil exploration and poaching.

Southern Watershed: Species present here are similar to those in the Trinity Hills. However, the wildhog population is reported to have been reduced substantially. Squatting on the boundaries and inadequate patrols are some reasons for decline in wildlife numbers. Introduction of teak has also taken place here.

Little Tobago: This island is the habitat of the Bird of Paradise and 58 other species, mainly seabirds. Proper management and protection against poaching of eggs and chicks of seabirds are necessary.

Saut D' Eau Island: This island supports the only breeding colony of the brown pelican *Pelicanus occidentalis*. Other birds can also be seen here. Its inaccessibility prevents much poaching and wardens given ample protection.

Soldado Rock: A variety of seabirds, iguana and other lizards occur on this small island. Due to its inaccessibility it is relatively well protected but some poaching takes place.

Caroni Swamp: This area supports a diversity of shellfish, insects, birds, crabs, finfish, shrimp and other crustaceans and mammals such as the silky anteater. The diverting of drainage systems nearby has altered the hydrology of the swamp causing certain major vegetational changes to occur. Pollution is also a major threat. Most economically important species such as the mangrove oyster have been over-exploited. The status of the most prominent species in the swamp, the scarlet ibis, is uncertain. Changes in the salinity and fauna of parts of the swamp have apparently resulted in the lack of appropriate food for scarlet ibis nestlings and the trend towards birds nesting elsewhere in Trinidad or on the mainland. Patrols have been hindered by the lack of a functional boat engine for some years.

Kronstadt Island: Birds are the main existing species and some efforts have been made for the protection of the habitat. However, extensive quarrying of the island for

barytes has significantly affected the wildlife and poaching does occur. The introduction of cats has also affected populations of some species.

Morne L'Enfer: Game animals and birds are most common. Threats include poachers and intensive oil exploitation.

St Giles Islands: This is the only breeding site in the country of the magnificent frigate birds *Fregata magnificens* and the red-footed booby *Sula sula*. Nest raids on the island have reduced their numbers.

Bush Bush: Red howler and capuchin monkeys, reptiles, fish and insects and 171 species of birds have been recorded from this area of Nariva Swamp. Threats include hunting, fishing, forest exploitation and cattle grazing (recently controlled). Efforts have been made to improve the status of this area but it is very accessible and also used for illegal purposes such as the growing of marijuana.

Inventories of the pockets of diversity of important species have been conducted by various research organisations as well as the Forestry Division, Wildlife Section in conjunction with international organisations such as the OAS and the FAO (Thelen & Faizool 1980; Bindernagel 1984; Asibey 1984b). The Wildlife Section also has an ongoing programme where its wildlife officers make continuous surveys of game animals in the field and recently extension of this work has begun to include invertebrates such as insects.

The Wildlife Section of the Forestry Division is the primary unit responsible for surveying and documenting wildlife species. Manpower and transportation are limited and scientific officer are often graduates hired on a temporary and daily paid basis. Financial resources are derived directly from government grants. For the year 1990 this amounted to TT\$40,000 for research purposes. Marine, freshwater and other terrestrial organisms are surveyed and documented depending on interest by researchers of the University of the West Indies (UWI), Institute of Marine Affairs (IMA) and other organisations. Funding for these projects is largely from Government.

The Wildlife Section of the Forestry Division gives on-the-job training to all its Wildlife Officers. The basic requirement for such a job is an undergraduate degree in Zoology, Ecology or Agriculture or a Diploma in Forestry and Wildlife Management from the Forestry School of the Eastern Caribbean Institute for Agriculture and Forestry (ECIAF). Sub-professional training can be received at ECIAF. Undergraduate or postgraduate training in wildlife management would be valuable to produce more research officers who can initiate and direct scientific studies. At present, such levels of training can not be had at the UWI or other institutions. Current training available at the UWI is very strong in marine and freshwater sciences; more emphasis needs to be put into terrestrial ecology and wildlife management.

D.3 Evaluation and growth characteristics of target species

Some potentially valuable species of animals have been investigated for their biology and potential for exploitation by various researchers. At present two main groups of animals have high potential for exploitation for food other than from wild

stocks, viz. game animals and aquatic crustacea, mollusca and fish. The potential of species for uses other than for food has not been adequately investigated.

Attempts have been made to rear and breed in captivity some game animals locally. The most appropriate species for this are agouti, lappe, deer, wildhog, cocrico and ducks. Limited success has been obtained with tatoo and manicou because of the special care needed for the young. Similarly, morocoy has been farmed but without much success. No commercial farming on a large scale is undertaken; most operations are small scale, in backyard pens or enclosures. Studies on the biology and rearing techniques of these species are listed in Table 6. A review of species amenable to farming and details of farming the most important of these are given by Asibey (1984c) and Wildlife Section, Forestry Division (1989). The Wildlife Section, Forestry Division has a great deal of experience with captive breeding and rearing of game species but details are not published. The Pointe-a-Pierre Wildfowl Trust is a private body involved in captive breeding of several waterfowl species of conservation interest but no publications have been produced.

Aquatic organisms with potential for culture include fish, mollusca and crustacea. Publications which give details of aspects of the biology of potentially valuable species are listed in Table 6. Studies have been conducted by the Zoology Department, UWI, to a large extent. Some studies have been made by the IMA. Further infrastructure and funds are essential in order to continue this type of research. The Fisheries Division's Aquaculture Project at Bamboo Grove has also been involved in aquaculture but its work is largely related to the non-indigenous tilapia and no publications have resulted within recent times.

Infrastructure and financial resources for evaluating the growth characteristics of potentially important species are basically similar to those available for inventorying and surveying these species (see previous section). The level of training necessary for serious scientific research to be conducted on the biology of these species is at least a first degree in the life sciences. Such training is available locally at the UWI but, as mentioned in the previous section, programmes there tend to concentrate at present on aquatic sciences and therefore the biology of aquatic species. Very little research on waterfowl or terrestrial game animals is done at this institution because of the interests of staff.

D.4 Diversity of genetic expression of target species

To our knowledge, no information is available on this subject for any potentially important animal species.

D.5 Training

In Trinidad and Tobago there are several institutions which are capable of training personnel in fields related to taxonomy and conservation biology.

The Forestry School of the Eastern Caribbean Institute of Agriculture and Forestry trains lower level personnel providing a Diploma in Forestry and Wildlife Management. In addition, on-the-job training is given to wildlife officers at the Forestry Division.

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The University of the West Indies provides Natural Science degrees in which majors in Zoology or Botany provide good training in taxonomy and conservation biology. A major in Zoology also offers an option in Fisheries and Aquaculture which deals with the biology and technology of culture of various local species.

Training in the taxonomy of specialist groups, such as certain insects, is unavailable locally. In addition, museum development and training of curators would be invaluable in order to maintain the existing specimen collections in the country.

Table 6 Studies on the biology and rearing of indigenous potentially important species.

Species	Reference
Mammals:	
<i>Dasyprocta agouti</i>	Ramdial & Ramdial (undated) Smythe (1978) [<i>D. punctata</i>]
<i>Agouti paca</i>	Ramdial (undated)
<i>Dasyopus novemcinctus</i>	Ramdial & Ramdial (undated)
<i>Mazama americana</i>	Sampath (1984)
Fish:	
<i>Hoplosternum littorale</i>	Singh (1978) Ramnarine (1989) Ramnarine (1990) Ramnarine (PhD in progress) Cazabon (1987)
<i>Corydoras aeneus</i>	Alkins (1987) Mohammed (1989) Mohammed (MPhil in progress) Hosein (1985) Samlalsingh (1989) Kramer & McClure (1980)
<i>Agonostomus monticola</i>	Phillip (1990)
<i>Corynopoma riisei</i>	Durity (1988) Nelson (1964, 1965)
<i>Aequidens pulcher</i>	Gandhi (1990)
Crustacea:	
<i>Macrobrachium crenulatum</i>	Batchasingh (1987) Batchasingh & Ramnarine (1990)
<i>M. jelskii</i>	Gobin (1990)
Mollusca:	
<i>Mytella guyanensis</i>	Kishore (MPhil in progress)
<i>Donax</i> species	Carrington (1981) Buckmire (1989)
<i>Asaphis deflorata</i>	Webb (1987) O'Brady (1989)
<i>Pomacea urceus</i>	Lum Kong (1986) Lum Kong (1989) Lum Kong & Kenny (1989) Lum Kong & Ramnarine (1988) Bennett (1989)
<i>Melongena melongena</i>	Thomas (MPhil in progress) Budge (1973)

D.6 Propagation and farming of animals

The farming techniques used are of course quite diverse and dependent upon the species of animal concerned.

For game animals this involves an extensive form of farming where stock is collected from the wild and allowed to breed in captivity in fenced enclosures or cages. The captive breeding of game animals is not as yet an established enterprise. A body of people involved in the activity has formed the Wildlife Farming Association but it is not very active or high profile.

Farming of game animals is an extensive system (Asibey 1984c; Wildlife Section, Forestry Division 1989). Of all the game animals, the agouti has thus far successfully been farmed. Deer, lappe and wildhog have already been bred in captivity and have the potential for farming. Deer is potentially the most expensive in terms of land, fencing, health and availability of stock. Lappe, a hystricomorph rodent like the agouti, is believed to be as easy to house, feed and manage under captive conditions. Wildhog can be kept in small pens and farmed as domestic pigs. Manicou and morocoy have so far not given any encouraging records. Captive breeding of the tatoo is also difficult because of the nutritional requirements of the young. The cocrico, considered a pest in Tobago, can be reared like the domestic fowl.

Aquaculture techniques are, however, well established. Generally, production systems include the following:

Extensive: This involves the use of natural ponds and the collection of brood stock from the wild. No artificial feeding is given.

Semi-intensive: Involves the use of earthen embankment ponds with a developed drainage system; juveniles may be obtained from a hatchery; three types of ponds are used: nursery, brood and production ponds. Supplementary feeding is given.

Intensive: Juveniles are obtained from a hatchery usually located on the same site with the production operations; all stages included juveniles and brood stock are maintained in tanks. Diets are completely artificial.

Other techniques involved in aquaculture are as follows:

- a) Larviculture: includes the techniques in hatchery operations and production of seedstock.
- b) Breeding of broodstock in captivity: this may be natural or induced breeding. The latter involves the use of hormones or the manipulation of environmental conditions.

Aquaculture of the following is being performed at present:

Indigenous species

Round-headed cascadu (*Hoplosternum littorale*)

Non-indigenous species

Tilapia: a red hybrid produced from crossing *Oreochromis mossambicus* x *Sarotherodon hornorum* and a silver hybrid from *S. hornorum* x *Oreochromis niloticus*

Freshwater prawn (*Macrobrachium rosenbergii*)

All are culture in a semi-intensive or an extensive system. As the interest in the field increases, intensive forms of commercial culture of species will be developed. Culture of marine species has not yet been successfully performed at the commercial level. An attempt has been made at commercial production of *Penaeus monodon* and *P. vannamei* but failed. More recently larviculture of the mangrove oyster has been successfully attempted and grow-out trials are being conducted. Difficulties in the culture of marine species include the maintenance and cost of a seawater system.

The following persons and institutions are actively culturing species:

- 1) Caroni (1975) Ltd., Aquaculture Project, Orange Grove Estate, Orange Grove: semi-intensive culture of the non-indigenous *Macrobrachium rosenbergii*.
- 2) Institute of Marine Affairs (IMA), Hilltop Lane, Chaguaramas: semi-intensive culture of cascudu (*Hoplosternum littorale*), *Macrobrachium rosenbergii* and red hybrid tilapia.
- 3) Bamboo Grove Fish Farm, Fisheries Division, Ministry of Agriculture, Lands and Fisheries, Valsyn: Production of red hybrid tilapia fingerlings.
- 4) Ragoonath Fish Farm, Plum Mitán, Nariva: commercial aquaculture of the cascudu (*Hoplosternum littorale*).
- 5) Montano Shrimp Farm, Orange Valley: attempt at commercial culture of non-indigenous shrimp (*Penaeus monodon* and *P. vannamei*) from imported juveniles (postlarvae).
- 6) R. Batchasingh, Gran Couva: commercial hatchery production of cascudu (*Hoplosternum littorale*) fingerlings.
- 7) J. Rampersad & D. Ammons, Bayshore, Carenage: preliminary research and trials on the larviculture and production of the mangrove oyster *Crassostrea rhizophorae*.
- 8) The Emperor Valley Zoo, Port of Spain: the only established body where game animals are bred in any numbers in captivity for release into the wild or for export to other zoos. Species bred include deer, wildhog, agouti, lappe, maniocou, morocoy, iguana, ocelot, capuchin monkey.
- 9) Pointe-a-Pierre Wildfowl Trust, TRINTOC, Pointe-a-Pierre: this private organisation maintains habitats to encourage waterfowl breeding in the centre of an oil refinery complex as well as conducts artificial breeding in cages of several species of endangered species of indigenous waterfowl and some exotic species. These include muscovy duck, black-bellied whistling ducks, white-faced whistling ducks and scarlet ibis.

The status of aquaculture locally is good in terms of transfer of technology, however, financial resources for infrastructure can be a deterrent. Several other species with potential for culture are still to be investigated for their biology and techniques for culture (e.g. the local prawns *Macrobrachium* species, the catfish *Rhamdia quelen*, aquarium fish such as the pui pui, *Corydoras aeneus* (some research is in progress by a graduate student at UWI) and the tetra, *Hypostomus robinii*).

For terrestrial game species, the biology of several species must still be investigated in detail to promote efficient breeding and rearing. The most recent information

available is by Sampath (1984) and Vos (1982) on deer farming. Techniques of ranching available in other countries may be able to be adapted to the local situation.

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ANNEX D.1

Indigenous species of economic importance [The proposed protected areas within which they occur are given for some groups.

Conservation status: E – endangered; V – vulnerable; R – rare
(Thelen & Falzool 1980)].

Species	Habitat	Importance
Mammals		
Didelphidae:		
Black-eared opossum <i>Didelphis marsupialis insularis</i>	Forest, secondary growth Widespread	Hunting, food
Greater Trinidadian murine opossum <i>Marmosa mitis chapmani</i>	Forested areas Trinity Hills, Arena	Hunting, food, R
Lesser Trinidad murine opossum <i>Marmosa fuscata carri</i>	Dry, forested areas Arena, Trinity Hills	Hunting, food, R
Woolly opossum <i>Caluromys philander trinitatis</i>	Forest Trinity Hills, Asa Wright	Hunting, food, R Hunting, food, R
Water opossum <i>Chironectes minimus minimus</i>	Intermediate forest along river banks	Hunting, food, E
Cebidae:		
Red howler monkey <i>Alouatta seniculus insularis</i>	Dense forest Nariva Swamp, Chaguaramus, Trinity Hills	Disease monitoring, hunting, V
Capuchin <i>Cebus albifrons trinitatis</i>	Intermediate forest near coasts Nariva Swamp	Pets, hunting, V
Myrmecophagidae:		
Three-toed anteater <i>Tamandua longicaudata longicauda</i>	Grasslands and open forest Southern Watershed	Hunting, E
Silky anteater, Two-toed anteater <i>Cyclopes didactylus didactylus</i>	Coastal and swamp areas Caroni Swamp	Hunting, E
Dasypodidae:		
Nine-banded armadillo <i>Dasyphus novemcinctus novemcinctus</i>	Forest, mixed vegetation Matura, Madamas, Trinity Hills	Hunting, food, V
Sciuridae:		
Trinidadian squirrel <i>Sciurus granatensis chapmani</i>	Forested areas Widespread	Pets, hunting

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Species	Habitat	Importance
Erethizontidae: Prehensile-tailed porcupine <i>Coendu prehensilis longicaudatus</i>	Secluded forest Trinity Hills	Traditional medicine, E
Dasyproctidae: Agouti <i>Dasyprocta agouti</i>	Forest, secondary growth Widespread	Pets, hunting
Lappe <i>Agouti paca</i>	Dense moist forest with thick undergrowth and freshwater Matura, Navet, Trinity Hill	Hunting, food, V
Procyonidae: Crab-eating raccoon <i>Procyon cancrivorus cancrivorus</i>	Swamp and inland waterways Caroni Swamp, Nariva Swamp	Hunting, E
Mustelidae: Otter <i>Lutra enudris</i>	Swamps and estuaries Caroni Swamp, North Coast	Hunting, E
Tayra <i>Eira barbara trinitatis</i>	Montane forest Maracas, Madamas, Matura	Hunting, V
Felidae: Ocelot <i>Felis pardalis</i>	Montane forest Maracas, Madamas, Matura	Hunting, E
Trichechidae: Manatee <i>Trichechus manatus</i>	Coastal, brackish and inland waters with aquatic vegetation	Hunting, food, E
Tayassuidae: Collared peccary, wildhog <i>Tayassu tayaçu</i>	Forested areas Matura, Navet, Trinity Hills	Hunting, food, V
Cervidae: Red brocket, deer <i>Mazama americana trinitatis</i>	Intermediate forest Matura, Trinity Hills, Arena	Hunting, food, V
Birds		
Phalacrocoracidae: Neotropic cormorant, black duck <i>Phalacrocorax olivaceus</i>	Inland reservoirs, coasts Caroni Swamp	Hunting
Anhingidae: Anhinga <i>Anhinga anhinga</i>	Inland waters, swamp	Hunting, food

Species	Habitat	Importance
Ardeidae:		
Great blue heron <i>Ardea herodias</i>	Seas coasts, swamps	Hunting
White-necked heron <i>Ardea cocoi</i>	Freshwater lakes, swamps	Hunting
Great egret <i>Egretta alba</i>	Mangrove swamp Caroni Swamp	Conservation, E
Black-crowned night heron <i>Nycticorax nycticorax</i>	Mangrove swamp	Hunting, food, V
Yellow-crowned night heron <i>Nyctanassa violacea</i>	Mangrove swamps, reservoirs, coasts	Hunting
Rufescent tiger heron <i>Tigrisoma lineatum</i>	Mangrove swamp Nariva Swamp	Conservation, E
Stripe-backed bittern <i>Ixobrychus involucris</i>	Mangrove swamp Caroni Swamp	Hunting, food, E
Pinnated bittern <i>Botaurus pinnatus</i>	Mangrove swamp Caroni Swamp	Hunting, food, V
Cochleariidae:		
Boat-billed heron <i>Cochlearius cochlearius</i>	Mangrove swamp Caroni Swamp	Hunting, food, E
Threskiornithidae:		
Scarlet ibis <i>Eudocimus ruber</i>	Mangrove swamp Caroni Swamp	Hunting, food, a national bird, V
Anhimidae:		
Horned screamer <i>Anhima cornuta</i>	Herbaceous, freshwater swamp Nariva Swamp	Conservation, E
Anatidae:		
Fulvous tree (whistling) duck <i>Dendrocygna bicolor</i>	Mangrove and herbaceous swamps, Caroni, Nariva Swamps	Hunting, food, E
White-faced tree duck <i>Dendrocygna viduata</i>	Mangrove, herbaceous swamps Caroni, Nariva Swamps	Hunting, food, E
Black-bellied tree (whistling) duck <i>Dendrocygna autumnalis</i>	Swamps, marshy savannas	Hunting, V
Green-winged teal <i>Anas crecca</i>	Swamps, Tobago	Hunting
American wigeon <i>Anas americana</i>	Swamps	Hunting
White-cheeked pintail <i>Anas bahamensis</i>	Swamps	Hunting

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Species	Habitat	Importance
Blue-winged teal <i>Anas discors</i>	Swamps, freshwater marshes, reservoirs, seas coasts	Hunting, food
Northern shoveler <i>Anas clypeata</i>	Swamps	Hunting
Lesser scaup <i>Aythya affinis</i>	Swamps, reservoirs	Hunting
Ring-necked duck <i>Aythya collaris</i>	Swamps	Hunting
Masked duck <i>Oxyura dominica</i>	Mangrove swamp, freshwater marshes Caroni Swamp	Hunting, food, E
Accipitridae:		
White-tailed kite <i>Elanus leucurus</i>	Herbaceous swamp Nariva Swamp	Conservation, E
Pearl kite <i>Gampsonyx swainsonii</i>	Herbaceous swamp Nariva Swamp	Conservation, E
Swallow-tailed kite <i>Elanoides forficatus</i>	Montane forest Maracas, Madamas	Conservation, E
Everglade kite <i>Rostrhamus sociabilis</i>	Herbaceous swamp Nariva Swamp	Conservation, E
Zone-tailed hawk <i>Buteo albonotatus</i>	Semi-deciduous forest with steep coastal cliffs Chaguaramas	Conservation, E
Broad-winged hawk <i>Buteo platypterus</i>	Forest East Tobago	Conservation, E
Black-collared hawk <i>Busarellus nigricollis</i>	Herbaceous swamp Nariva Swamp	Hunting, E
Savanna hawk <i>Heterospizias meridionalis</i>	Marsh forest/palm marsh/ savanna complex Aripo Savanna	Conservation, E
Long-winged harrier <i>Circus buffoni</i>	Mangrove swamp Caroni Swamp	Conservation, E
Pandionidae:		
Osprey <i>Pandion haliaetus</i>	Reservoirs, waterways, sea coasts	Conservation
Cracidae:		
Trinidad piping guan, pawi <i>Aburria pipile</i>	Montane forest Madamas, Trinity Hills	Hunting, food, E
Aramidae:		
Limkin <i>Aramus guarauna</i>	Herbaceous swamp Nariva, Caroni Swamps	Conservation, E

Species	Habitat	Importance
Rallidae:		
Clapper rail <i>Rallus longirostris</i>	Mangrove swamps	Hunting
Spotted rail <i>Rallus maculatus</i>	Mangrove swamp Caroni Swamp	Hunting, food, V
Grey-necked wood rail <i>Aramides cajanea</i>	Mangrove swamp Caroni Swamp	Hunting, food, V
Rufous-necked wood rail <i>Aramides axillaris</i>	Remote areas with steep cliffs, crevices, sparse vegetation Chaguaramas, Blue Basin	Hunting, food, E
Sora <i>Porzana carolina</i>	Swamps, marshes	Hunting
Ash-throated crake <i>Porzana albicollis</i>	Mangrove and herbaceous swamps Caroni Swamp	Hunting, food, E
Yellow-breasted crake <i>Porzana flaviventer</i>	Mangrove lagoons, swamps Caroni Swamp	Hunting, food, E
Grey-breasted crake <i>Laterallus exilis</i>	Mangrove swamp Caroni Swamp	Hunting, food, V
Common gallinule <i>Gallinula chloropus</i>	Sea coast, mangrove swamp Buccoo Reef	Hunting, food, V
Purple gallinule <i>Porphyryla martinica</i>	Freshwater swamps, marshes	Hunting
Caribbean coot <i>Fulica caribaea</i>	Marshes	Hunting
Charadriidae:		
Southern lapwing <i>Vanellus chilensis</i>	Marshy savannas, open areas near water	Hunting
Black-bellied plover <i>Pluvialis squatarola</i>	Coastal mudflats	Hunting
American golden plover <i>Pluvialis dominica</i>	Savannas, coasts, grassy areas	Hunting
Semi-palmated plover <i>Charadrius semipalmatus</i>	Coasts, marshes	Hunting
Collared plover <i>Charadrius collaris</i>	Sandy beaches, mudflats, savannas	Hunting
Thick-billed plover <i>Charadrius wilsonia</i>	Mudflats, swamps, beaches	Hunting
Scolopacidae:		
Solitary sandpiper <i>Tringa solitaria</i>	Freshwater habitats	Hunting

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Species	Habitat	Importance
Lesser yellowlegs <i>Tringa flavipes</i>	Swamps, coastal mudflats, wet pastures	Hunting
Greater yellowlegs <i>Tringa melanoleuca</i>	Swamps, coastal mudflats, fresh waters	Hunting
Spotted sandpiper <i>Actitis macularia</i>	Coasts, swamps, forest streams	Hunting
Willet <i>Catoptrophorus semipalmatus</i>	Coasts, mudflats, inland swamps	Hunting
Least sandpiper <i>Calidris minutilla</i>	Coasts, flooded savannas, marshes, ditches	Hunting
White-rumped sandpiper <i>Calidris fuscicollis</i>	Coastal mudflats, marshes, reservoirs	Hunting
Semipalmated sandpiper <i>Calidris pusilla</i>	Coasts, inland marshes, reservoirs	Hunting
Western sandpiper <i>Calidris mauri</i>	Coastal mudflats, inland marshes	Hunting
Stilt sandpiper <i>Micropalama himantopus</i>	Coastal mudflats, lagoons, swamps	Hunting
Whimbrel <i>Numenius phaeopus</i>	Mudflats, swamps	Hunting
Common dowitcher <i>Limnodromus griseus</i>	Mudflats, freshwater swamps	Hunting
Common snipe <i>Gallinago gallinago</i>	Marsh forest/palm marsh/savanna complex	Hunting, food, E
Columbidae:		
Band-tailed pigeon <i>Columba fasciata</i>	Montane forest Maracas, Madamas	Hunting, E
Psittacidae:		
Yellow-headed parrot <i>Amazona ochrocephala</i>	Forests of Northern Range, Cedros	Pets, V
Scarlet-shouldered parrotlet <i>Touit huetii</i>	Marsh forest/palm marsh/savanna complex Nariva Swamp	Pets, E
Red-bellied macaw <i>Ara manilata</i>	Herbaceous swamp, savanna Nariva Swamp, Aripo Swamp	Pets, V
Blue and yellow macaw <i>Ara ararauna</i>	Herbaceous swamp Nariva Swamp	Pets, presumed extinct
Cuculidae:		
Dark-billed cuckoo <i>Coccyzus melacoryphus</i>	Mangrove Caroni Swamp	Conservation, E

Species	Habitat	Importance
Strigidae: Striped owl <i>Asio clamator</i>	Semi-deciduous forest East Tobago	Conservation, E
Caprimulgidae: Rufous nightjar <i>Caprimulgus rufus</i>	Semi-deciduous forest Chaguaramas	Conservation, E
Trochilidae: White-tailed sabrewing <i>Campylopterus curvipennis</i>	Forest East Tobago	Conservation, E
White-tailed golden throat <i>Polytmus guainumbi</i>	Marsh forest/palm marsh/ savanna complex Aripo Savannas	Conservation, E
Blue-tailed emerald hummingbird <i>Chlorostilbon mellisugus</i>	Semi-deciduous forest Chaguaramas	Conservation, E
Dendrocolaptidae: Straight-billed woodcreeper <i>Xiphorhynchus picus</i>	Mangrove swamp Caroni Swamp	Conservation, E
Formicariidae: Plain antvireo <i>Dysithamnus mentalis</i>	Forest East Tobago	Conservation, E
Cotingidae: White bellbird <i>Procnias alba</i>	Montane forest Madamas, Maracas	Conservation, E
Tyrannidae: Venezuelan flycatcher <i>Mniarchus venezuelensis</i>	Forest Tobago	Conservation, E
Sulphury flycatcher <i>Tyrannopsis sulphurea</i>	Herbaceous swamp, marsh forest/palm marsh/ savanna complex	Conservation, E
Lesser elaenia <i>Elaenia chiriquensis</i>	Marsh forest/palm marsh/ savanna complex Aripo Savannas	Conservation, E
Crested doradito <i>Pseudocolopteryx sclateri</i>	Mangrove Caroni Swamp	Conservation, E
Turdidae: Orange-billed nightingale thrush <i>Catharus aurantiirostris</i>	Montane forest Maracas, Madamas	Conservation, E

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Species	Habitat	Importance
Icteridae:		
Moriche oriole, moriche <i>Icterus chryscephalus</i>	Herbaceous swamp, savanna/ palm forest Nariva Swamp, Aripo Savannas	Pets, E
Coerebidae:		
Red-legged honeycreeper <i>Cyanerpes cyaneus</i>	Forest East Tobago	Conservation, E
Tersinidae:		
Swallow tanager <i>Tersina viridis</i>	Montane forest Maracas, Madamas	Conservation, E
Thraupidae:		
Blue-capped tanager <i>Thraupis cyanocephala</i>	Montane forest Maracas	Conservation, E
Blue-hooded euphonia <i>Euphonia musica</i>	Montane forest Maracas, Madamas	Pets, E
Fringillidae:		
Yellow-bellied seedeater, silverbeak <i>Sporophila nigricollis</i>	Light woodland, forest edges Charguaramas, East Tobago	Pets, E
Variable seedeater, picoplat (Tobago) <i>Sporophila americana</i>	Forest edges, semi-open areas East Tobago	Pets, E
Ruddy-breasted seedeater, robin <i>Sporophila minuta</i>	Forest, open areas, marsh edges, cultivated lowlands	Pets, V
Red siskin, colorado <i>Spinus cucullatus</i>	Semi-deciduous forest East Tobago	Pets, on verge of worldwide extinction
Red-capped cardinal <i>Paroaria gularis</i>	Mangrove swamp Caroni Swamp	Conservation, E
Lesser seed finch, bullfinch, chickichong, twa twa <i>Oryzoborus angolensis</i>	Herbaceous swamp, marsh forest/palm marsh/ savanna complex, semi-deciduous forest	Pets, E
Large-billed seed finch, twa twa <i>Oryzoborus crassirostris</i>	Herbaceous swamp, light woodland Nariva Swamp	Pets, E
Grey seedeater, picoplat <i>Sporophila intermedia</i>	Lowland secondary growth, light forest Nariva Swamp	Pets, E

Species	Habitat	Importance
Reptiles		
Dermochelyidae:		
Leatherback turtles <i>Dermochelys coriacea</i>	Nests on open beaches with strong surf Matura, Madamas, Manzanilla, Tobago	Food, E
Cheloniidae:		
Pacific Ridley <i>Lepidochelys olivacea</i>	Nests on small North Coast bays	Food, E
Loggerhead turtle <i>Caretta caretta</i>	Nests on North Coast bays	Food, E
Hawksbill turtle <i>Eretmochelys imbricata</i>	Nests on small bays North Coast, Chaguaramas, East Tobago	Food, craft, E
Green turtle <i>Chelonia mydas</i>	Nests on sheltered bays Matura	Food, E
Emydidae:		
Galap <i>Rhinoclemys punctularia</i>	Rivers and swamps Widespread	Pets
Chelyidae:		
Mata mata <i>Chelus fimbriatus</i>	Freshwater swamps Nariva Swamp	Food, E
Testudinidae:		
Morocoy, yellow-footed <i>Geochelone denticulata</i>	Forested areas Trinity Hills	Pets, religious purposes, E
Morocoy, red-footed <i>Geochelone carbonaria</i>	As above	Food
Gekkonidae:		
Ocellated gecko <i>Gonatodes ocellatus</i>	Tobago	Conservation
Iguanidae:		
Common iguana <i>Iguana iguana</i>	Forest areas	Hunting, food
Teiidae:		
Mountain teiid <i>Proctoporus shrevei</i>	High mountain forests of the Northern Range	Conservation, R

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Species	Habitat	Importance
Matte, Northern tegu or jacuaru <i>Tupinambis nigropunctatus</i>	Widespread in a variety of conditions	Hunting, R
Crocodylidae: Spectacled caiman <i>Caiman sclerops</i>	Rivers and swamps Widespread	Hunting, skin, stuffed as curios
Boidae: Anaconda <i>Eunectes murinus</i>	Freshwater swamps, lowland rivers Nariva Swamp	Hunting, oils
Colubridae: Mangrove snake <i>Liophis cobella</i>	Swamp Caroni, Nariva Swamps	Hunting, R
False coral <i>Erythrolamprus aesculapii ocellatus</i>	Tobago	Conservation
Amphibians		
Pipidae: Surinam toad <i>Pipa pipa</i>	Swamp forests Nariva Swamp, Cedros Peninsula	Conservation, R
Leptodactylidae: Mountain chicken, edible frog <i>Leptodactylus bolivianus</i>	Forest and swamp Mayaro, Cedros	Food, R
Hylidae: Golden tree frog <i>Phyllodytes auratus</i>	Bromeliads on summit of El Tucuche, El Cierro del Aripo	Conservation, E
Freshwater and Estuarine Fish		
Megalopidae: Tarpon, grand ecaille <i>Megalops atlanticus</i>	Near coasts, at river mouths	Food, sport fishing
Erythrinidae: Guabine, trahira, terarira, tigerfish <i>Hoplias malabaricus</i>	Drainages south of the Northern Range, widespread	Food, aquarium trade
Yarrow, jejü, yarau <i>Hoplerythrinus unitaeniatus</i>	Drainages south of the Northern Range	Food
<i>Erythrinus erythrinus</i>	Drainages south of the Northern Range, scattered	Food

Species	Habitat	Importance
Gasteropelecidae:		
Common hatchetfish <i>Gasteropelecus sternicla</i>	Streams in southwest peninsula	Potential for aquarium trade
Characidae:		
Stout sardine, silverfish <i>Curimata argentea</i>	Northern parts of island in muddy streams, waterholes and drains	Aquarium trade, food
The Calypso tetra <i>Megalampodus axelrodi</i>	Stagnant, muddy waters	Potential for aquarium trade
Sardine doree, featherfish tetra <i>Hemigrammus unilineatus</i>	Drainages south of the Northern Range, in muddy waters and forest pools	Potential for aquarium trade
Sardine, sardine doree <i>Odontostilbe pulchre</i>	Watersheds south of the Northern Range	Potential for aquarium trade
Silver tetra <i>Gymnocarymhus thayeri</i>	Streams in Erin	Potential for aquarium trade
Pink-finned sardine <i>Astyanax bimaculatus</i>	Drainages south of the Northern Range, widespread	Potential for aquarium trade, food
Hunch-back sardine, glassfish <i>Roeboidea dayi</i>	Drainages south of the Northern Range	Potential for aquarium trade, food
Mountain stream sardine, band-tailed tetra <i>Hemibrycon taeniurus</i>	Restricted to middle and upper courses of south-flowing rivers of the Northern Range	Some potential for aquarium trade, food
Sword-tailed tetra, swallow-tailed sardine <i>Corynopoma riisei</i>	Drainages south of the Northern Range, widespread	Export aquarium trade
Gymnotidae:		
Cutlass fish, tiger knifefish <i>Gymnotus carapo</i>	Pools and ravines south of the Northern Range	Export aquarium trade
Pimelodidae:		
River catfish <i>Rhamdia quelen</i>	Drainages south of the Northern Range, widespread	Food, aquarium trade
Blind catfish <i>Rhamdia quelen urichi</i>	Oropouche Caves	Endemic subspecies
Callichthyidae:		
Pui pui, goldfish, armoured catfish <i>Corydoras aeneus</i>	Streams and pools south of the Northern Range	Export aquarium trade
Flathead cascudu, chato <i>Callichthys callichthys</i>	Muddy and brackish slow-moving waters, swamps	Export aquarium trade, food

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Species	Habitat	Importance
Roundhead cascadu <i>Hoplosternum littorale</i>	Muddy and brackish slow-moving waters, swamps	Food
Loricariidae:		
Bearded teta <i>Ancistrus cirrhosus</i>	Drainage south of the Northern Range	Export aquarium trade, food
Teta <i>Hypostomus robinii</i>	As above	Export aquarium trade, food
Cyprinodontidae:		
Jumping guabine <i>Rivulus hartii</i>	Abundant throughout the island	Aquarium trade
Poeciliidae:		
Guppy, millions fish <i>Poecilia reticulata</i>	Abundant throughout the island	Limited aquarium trade, scientific research
Mugilidae:		
Mountain mullet <i>Agonostomus monticola</i>	Rivers and streams draining north of the Northern Range	Food, sport fishing
Centropomidae:		
Brochet, snook <i>Centropomus pectinatus</i> , <i>C. undecimalis</i> , <i>C. ensiferus</i> , <i>C. parallelus</i>	Coastal and brackish waters	Food, sport fishing
Polycentridae:		
Black coscorob, schomburaks leaffish <i>Polycentrus schomburgkii</i>	Rivers and streams south of the Northern Range	Aquarium trade
Cichlidae:		
Blue acara, small coscorob <i>Aequidens pulcher</i>	Streams south of the Northern Range to Couva and Ortoire Rivers	Food, aquarium trade
Large (brown) coscorob, Cichlasoma portalegrensis <i>Cichlasoma bimaculatum</i>	Muddy waters south of the Northern Range	Food, aquarium trade
Matawal, watamal <i>Crenicichla alta</i>	Streams, ponds south of the Northern Range, widespread	Food, aquarium trade
Tetraodontidae:		
Puffer <i>Colomesus psittacus</i>	Coastal waters, ventures upstream	Aquarium trade

Species	Habitat	Importance
Marine Fish		
Carcharhinidae:		
Requiem sharks		
Black-fin shark <i>Carcharhinus limbatus</i>	Marine	Commercially exploited
Black-nose shark <i>C. acronotus</i>	Marine	Commercially exploited
Silky shark <i>C. falciformis</i>	Marine	Commercially exploited
Bull shark <i>C. leucas</i>	Marine	Commercially exploited
Tiger shark <i>Galeocerdo cuvieri</i>	Marine	Commercially exploited
Lemon shark <i>Negaprion brevirostris</i>	Marine	Commercially exploited
Sphyrnidae:		
(Hammerhead sharks)		
Hammerhead shark, scalloped hammerhead <i>Sphyrna lewini</i>	Marine	Commercially exploited
Bonnet-head shark <i>S. tiburo</i>	Marine	Commercially exploited
Elopidae:		
Banane, ladyfish or tenpounder <i>Elops saurus</i>	Marine	Commercially exploited
Clupeidae:		
Sardine, herring, false herring <i>Harengula clupeola</i>	Marine	Commercially exploited
Atlantic thread herring <i>Opisthonema oglinum</i>	Marine	Commercially exploited
Engraulididae:		
Joshua, zanchois <i>Anchoa trinitatis</i> , <i>Atlantic unchosella</i> , <i>Cetengraulis edentulus</i>	Marine	Commercially exploited
Exocetidae:		
Flying fish <i>Hirundichthys affinis</i>	Marine	Commercially exploited

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Species	Habitat	Importance
Mugilidae:		
Grey mullet <i>Mugil curema</i> , <i>M. cephalus</i>	Marine	Commercially exploited
Grey mullet, Lebranche <i>M. liza</i>	Marine	Commercially exploited
Sphyraenidae:		
Barracuda <i>Sphyraena barracuda</i>	Marine	Commercially exploited
Bechine, Southern sennet <i>S. picudilla</i>	Marine	Commercially exploited
Serranidae:		
Red hind <i>Epinephelus guttatus</i>	Marine	Commercially exploited
Nassau grouper <i>E. striatus</i>	Marine	Commercially exploited
Grouper, jewfish <i>E. itajara</i>	Marine	Commercially exploited
Black grouper <i>Mycterperca bonaci</i>	Marine	Commercially exploited
White grouper <i>M. cidi</i>	Marine	Commercially exploited
Rachycentridae:		
Codfish cobia, sergeant fish <i>Rachycentron canadum</i>	Marine	Commercially exploited
Carangidae:		
Couvalli, crevalle jack <i>Caranx hippos</i>	Marine	Commercially exploited
Big-eye cavali <i>C. latus</i>	Marine	Commercially exploited
Pompano, palometa <i>Trachinotus goodei</i>	Marine	Commercially exploited
Moonshine <i>Selene vomer</i>	Marine	Commercially exploited
Scombridae:		
Carite, serra spanish mackerel <i>Scomberomorus brasiliensis</i>	Marine	Commercially exploited
Kingfish, king mackerel <i>S. cavalla</i>	Marine	Commercially exploited

Species	Habitat	Importance
Wahoo <i>Acanthocybium solandri</i>	Marine	Commercially exploited
Bonito <i>Sarda sarda</i> , <i>Auxis thazard</i>	Marine	Commercially exploited
Little tuna <i>Euthynnus alletteratus</i>	Marine	Commercially exploited
Stromateidae:		
Butterfish <i>Peprilus paru</i>	Marine	Commercially exploited
Istiophoridae:		
Sailfish <i>Istiophorus albicans</i>	Marine	Commercially exploited
Lutjanidae:		
Walliacke, lane snapper <i>Lutjanus synagris</i>	Marine	Commercially exploited
Pargue <i>L. aya</i>	Marine	Commercially exploited
Vivanot, silk snapper <i>L. vivanus</i>	Marine	Commercially exploited
Sorbe, mutton snapper <i>L. analis</i>	Marine	Commercially exploited
Mangrove pargue, grey snapper <i>L. griseus</i>	Marine	Commercially exploited
Dent chien, dog snapper <i>L. jocu</i>	Marine	Commercially exploited
Pomadasyidae:		
Cro-cro, latin grunt <i>Haemulon steindachneri</i>	Marine	Commercially exploited
Red-mouth grunt, white grunt <i>H. plumieri</i>	Marine	Commercially exploited
French grunt <i>H. flavolineatum</i>	Marine	Commercially exploited
Lippe, black margate <i>Anisotremus surinamensis</i>	Marine	Commercially exploited
Pomatomidae:		
Ancho, bluefish <i>Pomatomus saltatrix</i>	Marine	Commercially exploited

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Species	Habitat	Importance
Sciaenidae:		
Croaker <i>Micropogonias furnieri</i>	Marine	Commercially exploited
Salmon, croakern <i>Cynoscion acoupa</i> , <i>C. jamaicensis</i>	Marine	Commercially exploited
Gerreidae:		
Blinch <i>Gerres cinereus</i>	Marine	Commercially exploited
Ephippidae:		
Paoua, spadefish <i>Chaetodipterus faber</i>	Marine	Commercially exploited
Pleuronectidae:		
Tropical flounder <i>Paralichthys tropicus</i>	Marine	Commercially exploited
Crustacea		
Penaeidae:		
Red spotted shrimp <i>Penaeus brasiliensis</i>	Gulf of Paria	Food
White shrimp <i>P. schmitti</i>	Gulf of Paria	Food
Brown shrimp <i>P. subtilis</i>	Gulf of Paria	Food
Pink shrimp <i>P. notialis</i>	Gulf of Paria	Food
Sea bob, honey shrimp <i>Xiphopenaeus kroyeri</i>	Gulf of Paria	Food
Palaemonidae:		
Crayfish <i>Atya scabra</i>	Streams, rivers of the Northern Range	Food
Crayfish <i>Macrobrachium carcinus</i>	Northern Range streams	Food
Crayfish <i>M. crenulatum</i>	Northern Range to central lowlands	Food
Crayfish <i>M. jelskii</i>	Widespread in lowland waters	Food
Crayfish <i>M. acanthurus</i>	Nariva Swamp	Food

Species	Habitat	Importance
Palinuridae:		
Lobster <i>Panulirus argus</i>	North coast Trinidad, coastal areas of Tobago	Food
Lobster <i>P. laevidaudus</i>	As above	Food
Grapsidae:		
Rock crab <i>Grapsus</i> species	Rocky shores	Food
Portunidae:		
Cirique, swimming crab <i>Callinectes bocourti</i> , <i>C. danae</i> , <i>C. arcuatus</i> , <i>C. sapidus</i> , <i>C. ornatus</i>	Caroni, Oropouche Swamps	Food
Gecarcinidae:		
Blue crab, land crab <i>Cardisoma guanhumi</i>	Caroni, Nariva Swamps, brackish coastal lands	Food
Callaloo crab, hairy crab <i>Ucides cordatus</i>	Caroni Swamp	Food
Red crab <i>Goniopsis cruentata</i>	Mangrove swamps	Food
Pseudothelphusidae:		
Manicou crab <i>Pseudothelphusa garmani</i>	North, Central Ranges	Food
Mollusca		
Polyplacophora (chitons):		
Pachro, sea cockroach <i>Chiton marmoratus</i> , <i>C. tuberculatus</i> , <i>Acanthopleura granulata</i>	Rocky shores	Food
Bivalvia:		
Rock mussel <i>Perna perna</i>	Rocky shores, North Coast	Food
Mok, mussel <i>Mytella guyanensis</i> , <i>M. falcata</i>	Caroni, Oropouche Swamps	Food
Clam <i>Phacoides pectinatus</i>	As above	Food
Oyster <i>Crassostrea rhizophorae</i>	As above	Food

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Species	Habitat	Importance
Chip chip <i>Donax denticulatus, D. striatus</i>	Sandy shores, east coast	Food
Gastropoda:		
Lambia, queen conch <i>Strombus gigas, S. costatus</i>	North coast of Trinidad, Tobago: sandy bottoms, lagoons, turtle grass beds	Food
Sea, black, swamp conch <i>Melongena melongena</i>	Muddy bottoms, swamps	Food
Swamp, sea conch <i>Pugilina morio,</i> <i>Thais trinitatensis</i>	Caroni, Oropouche Swamps	Food
River, black conch <i>Pomacea urceus</i>	Nariva Swamp, Caroni Plain	Food