A Study of the Aquatic Fauna of the Aripo Savannas

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INTRODUCTION

The Aripo Savannas are located within the Long Stretch Forest Reserve in east central Trinidad and are a number of open areas covered with grass-sedge vegetation amidst an extensive area of seasonal marsh forest.

This area has been proposed as a Scientific Reserve within the system of National Parks and Protected Areas in Trinidad and Tobago (Thelen and Faizool, 1980) since it has for a long time been recognised as being unusual, for example Kingsley (1871). However, research has concentrated largely on the flora rather than the fauna, for example Beard (1946, 1953) and Richardson (1963). Very limited information is available on the fauna, for example Quesnel (1979) and Thelen and Faizool (1980); and in particular the aquatic fauna has only briefly been reported since it is relatively limited and inconspicuous. Thelen and Faizool (1980) report the presence of small fish including sardines, guabin, cascorob and yaraw in ponds and waterways in the savannas, and occasional water boa in the ponds.

The nature of the aquatic fauna found in the savannas, however, is expected to be interesting because of the type of habitat supporting it. The savannas (lying about 30 to 45 metres above sea level) are very flat, and because of this, the impermeable clay or iron pan and lack of many natural streams and channels, drainage is very poor. In 1940, however, channels were excavated by the United States Armed Forces thus slightly improving drainage (Richardson, 1963).

The savannas lie mainly within the watershed of the Aripo River so that most of the water drains in a westerly direction via drainage channels and the Black River to the Aripo River. A small section drains towards the east to the Quare River (Fig. 1). The Black River is clear compared to the Aripo River which is laden with silt from upstream quarrying operations (Thelen and Faizool, 1980).

In the open savanna areas, the microtopography is either flat, undulating or composed or irregular hummocks with depressions between. These depressions and the drainage channels, both natural and man-made, hold water when the savanna floods during the rainy season but dry up in the dry season. They thus form temporary aquatic habitats and consequently this influences the nature of the fauna supported. Knowledge of the fauna found in these temporary systems is quite limited but observations by local naturalists have resulted in reports of fish such as *Cichlasoma bimaculatum*, *Hemigrammus unilineatus*, *Poecilia picta*, *Aphyocarax axelrodi*, *Odontostilbe pulcher* and *Rivulus hartii* (H. Boos, pers. comm.) and the amphibian *Leptodactylus sibilatrix* (J. S. Kenny, pers. comm.).

As a result of the lack of information on the aquatic fauna and the intrinsic interest of studying a temporary aquatic system, a small group of final-year zoology students of the University of the West Indies conducted a short survey of the aquatic fauna within a small section of the savannas as part of an exercise in community ecology.

RESULTS AND DISCUSSION

Eight sampling sites were studied in Savannas V, VI and VII, over a two-week period in November 1979 (Fig. 2). Sites A, F, G, and H were within the drainage channels and ditches while B, C, D and E were depressions in the savanna. Physical parameters such as depth, temperature and current speed were measured and a general collection of fauna was made including free-swimming and benthic fauna.

Table I summarises the physical data collected for the eight sites. No depth was measured at Site E since there was very dense plant growth and this also restricted faunal sampling. Water movement at Sites A and H could not be measured since flow was impeded by plant growth. The table shows the relatively high temperatures (29 — 33° C) associated with shallow stagnant pools except at Site G which was shaded by overhanging vegetation. The areas with flowing water were relatively cooler (26 — 27° C).

TABLE I:

PHYSICAL PARAMETERS OF SITES A — H

Location	Depth (cm)	Temperature (°C)	Current
A	59	27	very slow
B	5	32	stagnant
C	15	29	stagnant
D	15	33	stagnant
E	—	33	stagnant
F	30	27	0.2 m/sec.
G	7	26	stagnant
H	7	26	very slow

Table II summarises the fauna collected at all sites except Site E. Altogether 15 species were collected, nine of which were found at Site A which was also the deepest site and which in the height of the rainy season would be quite extensive and possibly continuous with the Aripo or Black Rivers. Sites A, F, G and H are also possibly continuous with each other and the main rivers during the rainy season hence the presence of fish in all of these sites.

The small ponds formed in the depressions in the savanna (Sites B, C and D) supported mainly arthropods such as pond

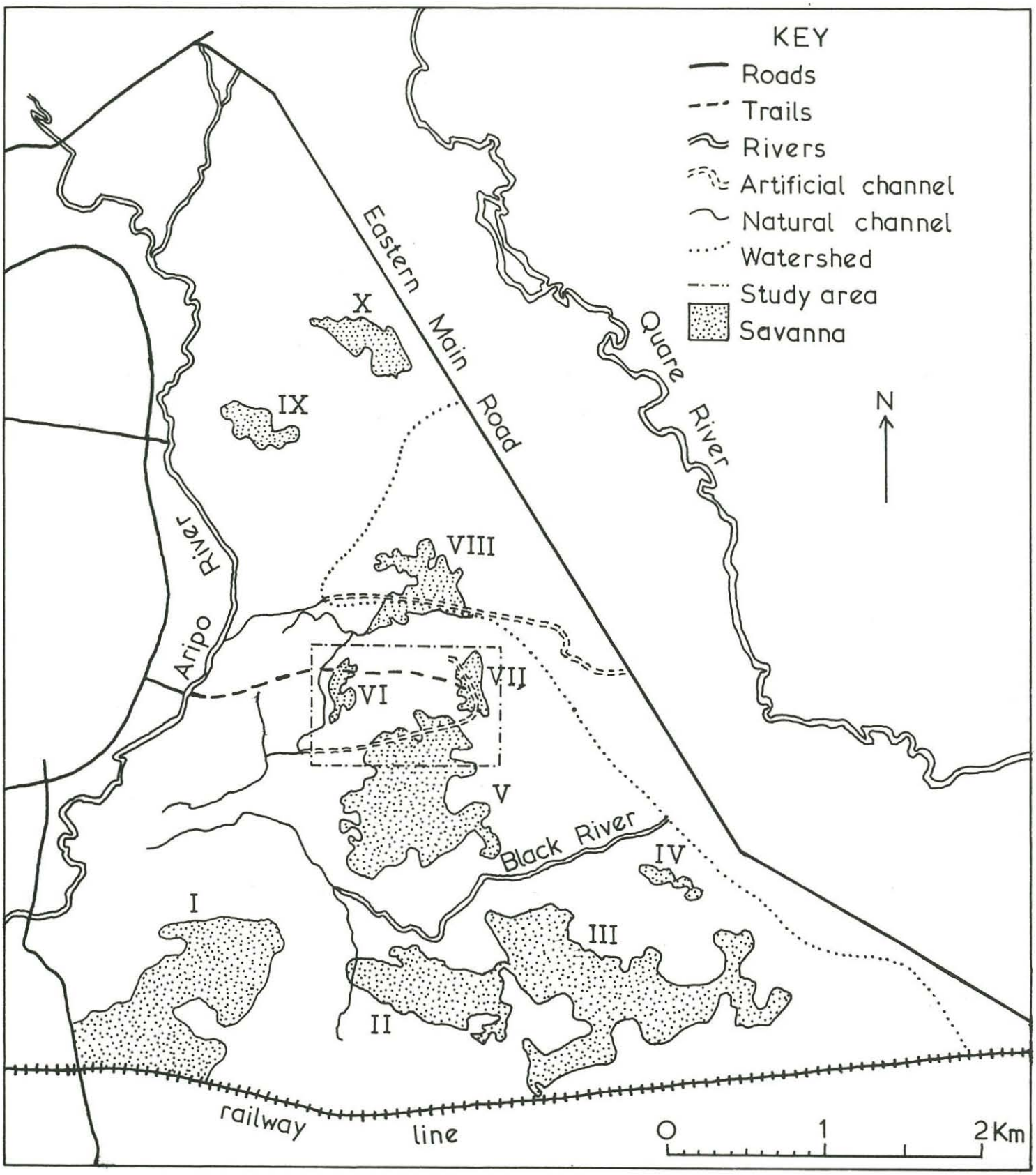

Fig. 1: Hydrography of the Aripo Savannas.

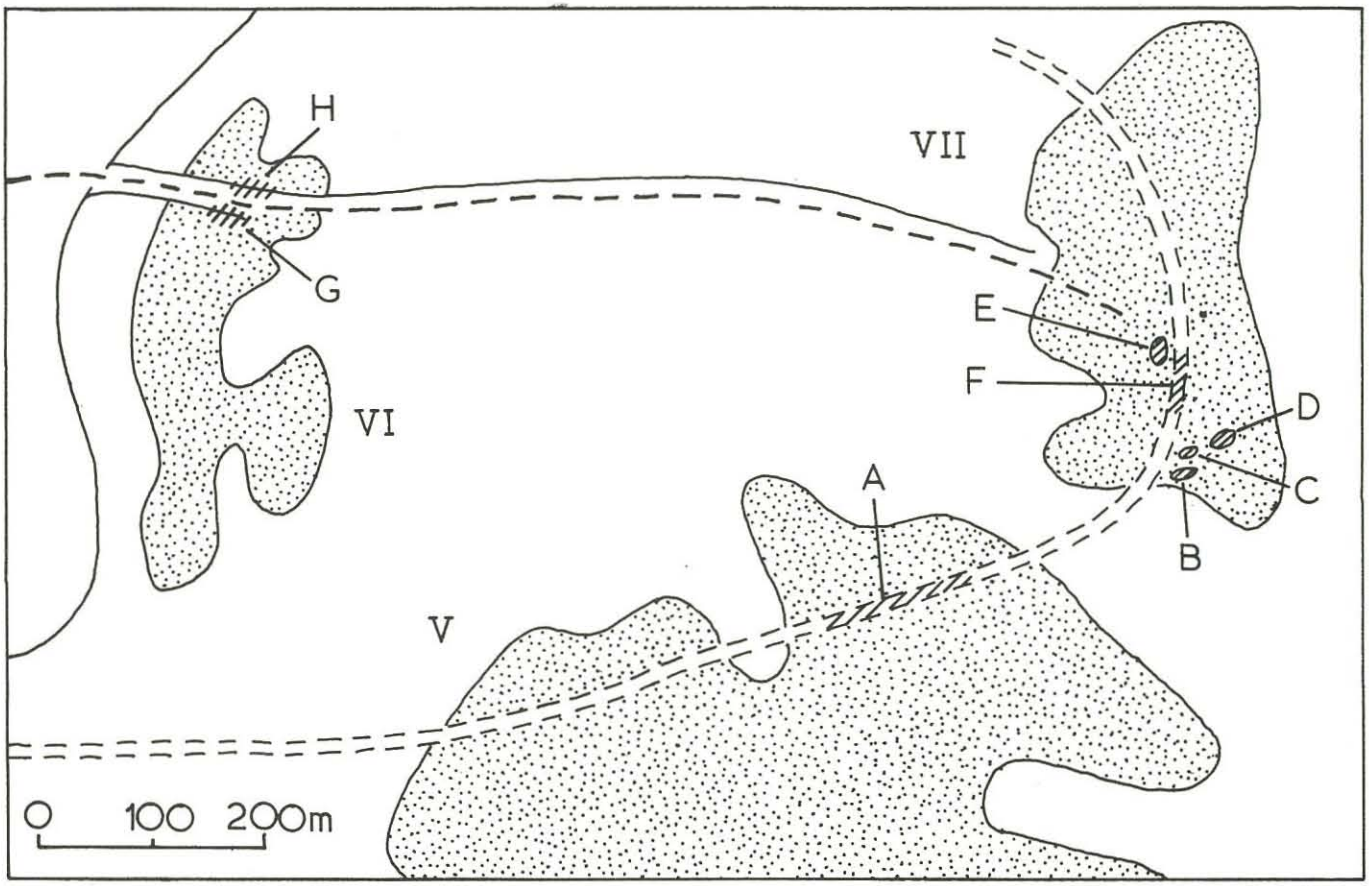

Fig. 2: Detail of study area showing sites A to H (key as in Fig. 1).

TABLE II

FAUNA COLLECTED AT SITES A – D AND F – H

Species	Sampling Site						
	A	B	C	D	F	G	H
Annelida:							
Oligochaeta						*	
Arthropoda:							
Odonata: Corduliidae (L)	*					*	
Aeshnidae (L)	*					*	
Lestidae (L)	*						
Ephemeroptera: Ephemerellidae (L)	*						
Hemiptera: Gerridae		*				*	
Notonectidae		*	*	*			
Coleoptera: Gyrinidae		*	*	*			
Vetebrata:							
Pisces: *Cichlasoma bimaculatum*	*				*		
Gymnotus carapo	*						
Hoplerythrinus unitaeniatus	*						
Hemigrammus unilineatus	*				*		*
Synbranchus marmoratus	*						
Callichthys callichthys						*	
Amphibia: *Bufo marinus* (L)		*					

* indicates presence of species

L Larval stage

skaters, water boatmen and whirligig beetles which are all capable of aerial dispersal so that colonisation of isolated pools of water is possible. Also, the *Bufo* tadpoles found at Site B would be temporary inhabitants.

Generally, the fauna is typical of that of a temporary system. For example, the dragonfly, damselfly and mayfly larvae are temporary inhabitants spending only their nymphal stages in the water, the adults being terrestrial. The odonatan nymphs require relatively long periods to develop (up to 2 years) and this could explain their presence only in Sites A and G and not the small pools. The fish in particular, are adapted to this type of environment. Distribution to and from isolated pools of water when the habitat is drying out in the dry season would be a major problem which is solved by species such as *Synbranchus* and *Callichthys* which are quite efficient at movement over land.

Also it is to be expected that in small isolated and stagnant aquatic habitats such as these, deoxygenation of the waters could be a major problem. This would be accentuated in the dry season when high temperatures increase the rates of consumption of oxygen by the inhabitants and decrease the solubility of the gas as well. Kramer *et al* (1978) discuss different respiratory strategies used by Amazonian fishes, many of these identical or similar to Trinidadian species. Among those mentioned is *Callichthys callichthys* which gulps air at the surface and uses the intestine as a site of oxygen uptake; *Hoplerythrinus unitaeniatus* which is capable of branchial as well as aerial respiration, the latter by using part of its gas bladder as a site for oxygen uptake; *Synbranchus marmoratus* which is amphibious, using the branchial chamber for aerial as well as aquatic respiration. This species can also aestivate in the dry season to avoid very harsh conditions. (Graham, 1978).

It is not confirmed whether *Cichlasoma bimaculatum* is an air-breather but Lowe-Mc Connell (1969) suggests that it may be since it can survive for a long time out of water and dissection reveals a well vascularised air-filled stomach. Although *Gymnotus carapo* is not a confirmed air breather either, it is related to the electric eel, *Electrophorus electricus* which uses its buccal cavity for air breathing.

It is also mentioned in Kramer *et al* (1978) that there is a possibility that fish with no special respiratory adaptations use the well oxygenated surface film and this may be the case with *Hemigrammus* and other sardines found in the savannas.

In summary then, the aquatic fauna of the Aripo Savannas is typical of that of a temporary aquatic system. The fauna is adapted for dispersal to new aquatic habitats and also for enduring harsh conditions associated with the small stagnant ponds. Other species are temporary inhabitants utilising the habitat when available for only parts of their life cycles.

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