

There is a rich avifauna in the delta, consisting of a majority of fish and insect eating species (Duhart & Descamps 1963; see also Viellard 1981). Among mammals, two piscivorous otter species occur. The major herbivorous species is Hippopotamus amphibius, but there is also a lamantee (Trichechus senegalensis), which feeds on Polygonum and Pistia. Wild bovinds and hippos have regressed considerably in recent decades. Their place is now taken by cattle.

12. Human activity and management

Around 1960, the delta was inhabited by c. 370,000 people. While the Peul are by far the dominant ethnic group, at least 7 other significant tribal entities occur. Human pressure on the delta has increased considerably during the droughts of the 1970s but, because of its fertility, the delta has been a centre of human habitation since prehistory.

Traditional uses of the delta include:

a) Cattle raising: As the flood recedes, good grazing becomes available. This occurs at a time when grasslands outside the delta tend to get exhausted, and a seasonal migratory movement results. The social aspects of this periodical migration are subtle and manifold and are discussed at length by Gallais (1967).

b) Fisheries: These used to be mainly in operation during the flood season, but fishing in the river and on the main lakes (Faguibine is especially productive) has now become perennial.

c) Since the construction of a dam at Markala in 1946, the fossil delta has been irrigated. More and more areas within the delta are also managed for rice and cotton cropping. One of the problems with rice culturing in the area is fish damage. Herbivorous species such as Coptodon zillii, Alestes baremoze, Distichodus brevipennis are particularly destructive to young rice plants. Another problem with irrigated agriculture is the spreading of Bulinus and Biomphalaria. The incidence of Bilharzia is up to 90% of the rural population. Malaria is another health hazard of the area.

A special activity of the Niger is the exploitation of the oyster-reefs as a source of lime. In view of the scarcity of calcium in the area, this is even the major source of this mineral locally.

3.6. SIERRA LEONE

by Patrick DENNY & James GREEN

Information from: Gerrath and Denny (1979) and Green (1979)

There have been so few limnological studies in Sierra Leone that detailed descriptions of individual waterbodies are rarely possible and only a general account can be provided. There are numerous small waterbodies still to be investigated but Lake Sonfon (Fig. 3.22) has been studied in more detail. Efforts are being made to describe the algae of Sierra Leone (Gerrath & Denny 1979, 1980 a, b; Carter & Denny 1982). From one river alone, the river Jong, 240 species of diatoms have been recorded of which 38 are new to science and have been described for the first time.

1. Geology, Climate and Geography

Sierra Leone, a small country on the west coast of Africa, lies between 7-10°N and 10-13°W. It is composed of three major topographic regions: (i) A low-lying coastal strip up to 150 m above sea level, 8-40 km wide made up of marine and deltaic sediments often of Pleistocene origin overlying crystalline schists and gneisses; (ii) A narrow escarpment; (iii) A low plateau from 300-1000 m a.s.l. which is mainly granitic. Bare granitic inselbergs form occasional mountainous regions rising to about 2000 m.

The fresh waters are dominated by a series of drainage valleys from the inland plateau to the Atlantic Ocean and these feed nine main river systems: the rivers Kaba, Mabile, Rokel, Jong (Taia), Sewa, Malen, Waanje, Mao and Mano.

The climate is tropical with a mean annual temperature of about 27°C. There is a severe dry season from November to March when the days are hot (32-35°C) and the nights cool (20°C) along the coast. The wet season is from June to September when the monsoonal south-westerlies precipitate over 500 mm of rain in a month at the coast. The mean annual rainfall around the coast is about 3000 - 5000 mm, but on the plateau it is 2000 - 2500 mm.

The rainy season produces large, deep, fast-flowing rivers, but in the dry season the rivers drop by up to 8 m to form shallow, meandering water-courses.

In the low-lying areas there are shallow lakes which are probably cut off from the river in the dry season. Three of the many lagoons along the River Sewa, for example, include: Lakes Gambia, Popei and Tibi while the coastal lagoons include Lake Mape (Table 3.14)

2. Physico-chemical characteristics of the water

Table 3.14 Situation and physico-chemical characteristics of some shallow water bodies in Sierra Leone.

Lake	Lat. N	Long. W	Alt. m	Area km ²	Depth m	Temp. °C	pH	Cond. 10 ⁻⁶ S cm ⁻¹	Alkalinity meq.dm ⁻³
Sonfon	9°15'	11°30'	549	8.2	8	30	6.8	33.0	0.11
Gambia	7°30'	11°58'	40	3.0	1.5	30	5.0	8.8	n.d
Popei	7°28'	12°00'	40	10.0	1.5	32	5.2	8.8	n.d
Tibi	7°25'	11°58'	40	3.0	1.5	32	4.9	8.1	n.d
Mape	7°08'	11°45'	5	---	2.0	30	7.5	40.0	0.07

Lake Sonfon (Fig. 3.22)

Location: Sula Mountains, Sierra Leone. This is the only permanent lake on the plateau. Some of its physico-chemical characteristics are included in Table 3.14.

Morphometry: The lake basin appears to have been formed by the collapse of the duricrust after deep weathering of subsurface layers. The total drainage area is 24.5 km². There are about seven small streams flowing into the lake, mainly on the eastern side, and an outflow leaves the lake at its southern end.

Macrophytes: In the dry season the greater part of the lake is covered by emergent vegetation, dominated by *Thalia geniculata* and including *Eleocharis dulcis*, *Polygonum* sp. and *Colocasia* sp. *Utricularia* was abundant in some parts, particularly around the outflow. Small amounts of *Nymphaea lotus* are present in the small area of open water. The whole of the emergent vegetation is said to be submerged at the height of the wet season.

Phytoplankton: Grönblad et al. (1968) record 24 species of desmids from the lake. *Euglena acus* and *Lepocinclis ovum* were the commonest Euglenophyta (Gerrath & Denny 1979) but several species of *Phacus* were also common. Other algae are recorded by Gerrath & Denny (1980 a & b). In general blue green algae are sparse; *Spirulina major* being the most frequent. Among the Cryptophyta *Cryptomonas ovata* was the most frequent. In the Dinococcales a new species of *Cystodinium* (*C. sonfonense*) was fairly common in the plankton. Of the Chlorococcales *Ankistrodesmus* spp and *Coelastrum* spp were common.

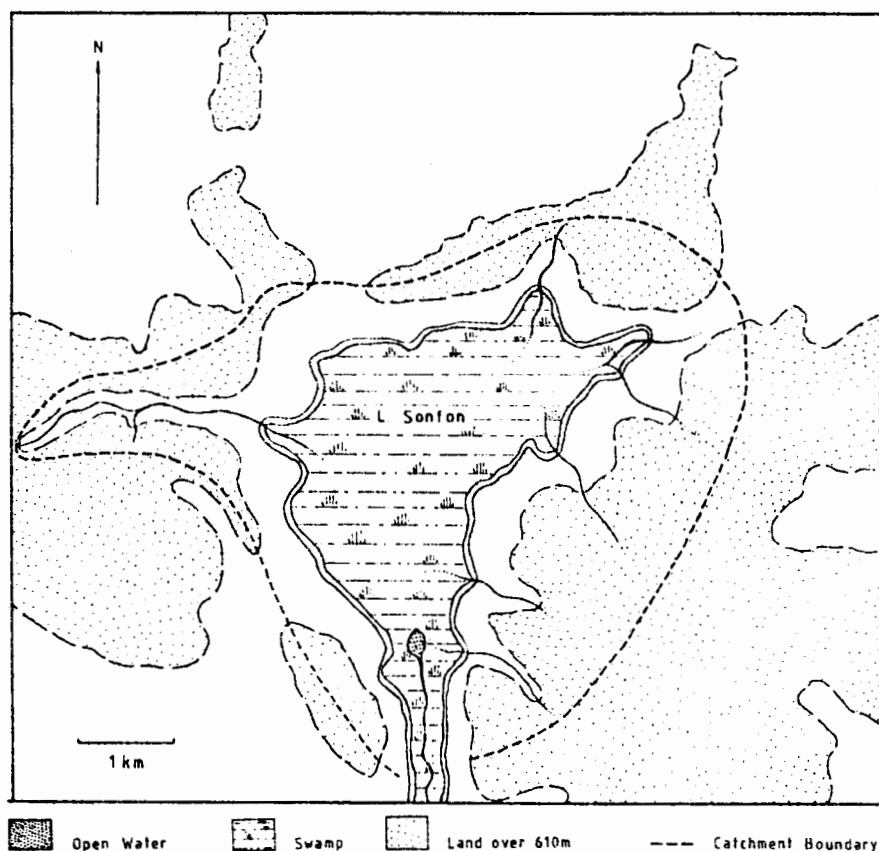


Fig. 3.22 Lake Sofon, Sierra Leone

Invertebrates: 92 species recorded so far, including 19 species of Rhizopoda and 12 species of Crustacea.

Zooplankton was very poorly developed in the dry season (April 1976). Rotifers (21 spp.) mainly found in Utricularia in the outflow swamp, include Filinia brachiata, Lecane tabida, Lecane wulferti and Lepadella imbricata. The blood sucking leech, Limnatis fenestrata was abundant, and responded rapidly to any disturbance of the water. Giant water bugs (Hydrocyrius columbiae) were common and breeding. Nine species of Odonata were found around the lake.

Fish: A small Barbus sp. and a sleeper-goby (Kribia sp.) were found in the open water, and two cyprinodonts (Epiplatys fasciolatus and Aphyosemion guineense) were found in the inflows.

Birds: 6 species were seen in April 1976: Anhinga rufa, Egretta alba, Bubulcus ibis, Plectropterus gambensis, Actophilornis africana and Ceryle rudis.

Human activity: The lake is rarely visited, but isolated hunters operate around its shores.

3.7. COURS INFÉRIEUR ET DELTA DE L'OUÉMÉ (BÉNIN) par Christian LEVEQUE

L'essentiel des informations utilisées provient des travaux de Colombani et al. (1972) et de Welcome (1971).

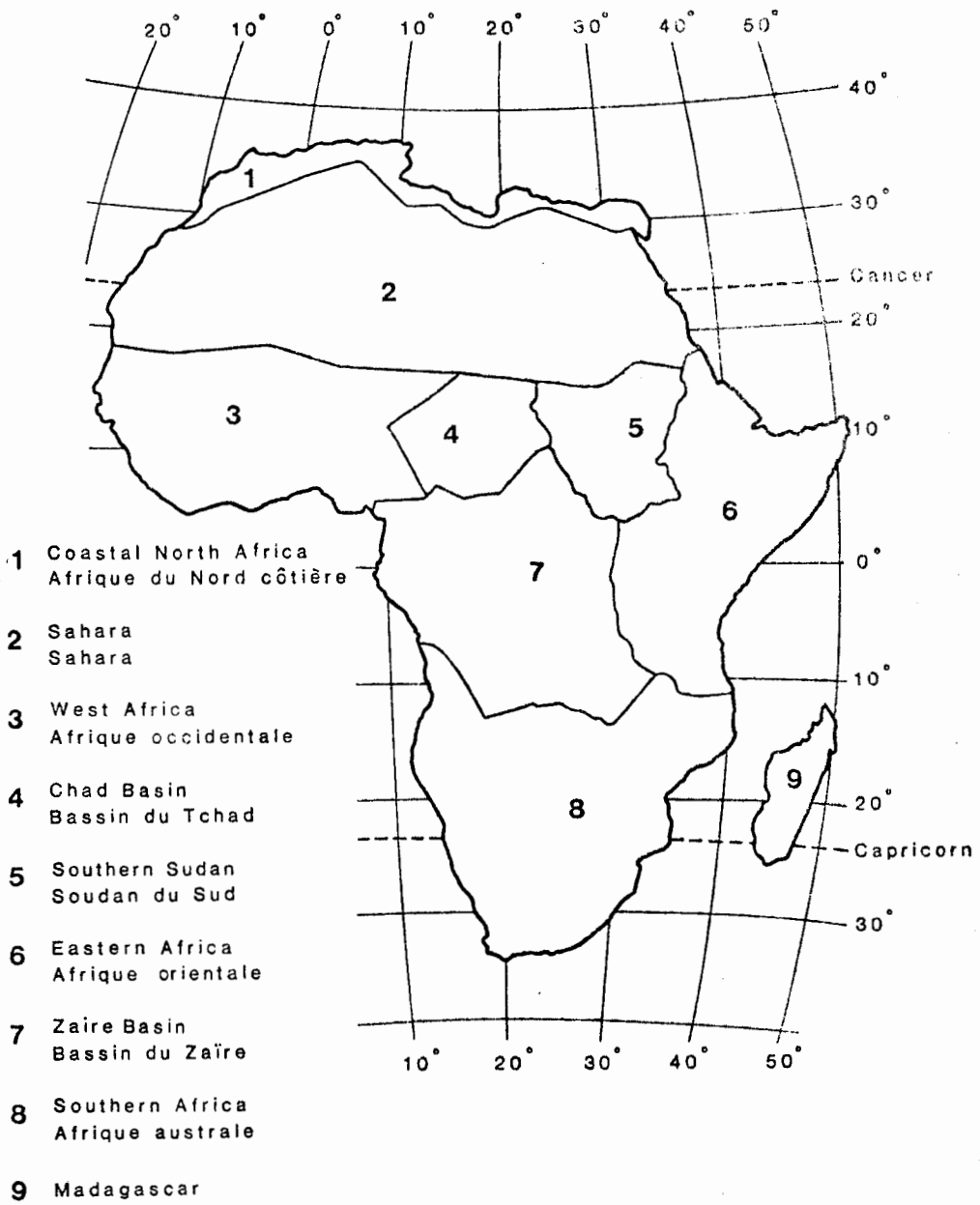
1. Géographie et morphologie (fig. 3.23)

Le bassin de l'Ouémé (50 000 km² environ) comprend deux unités géologiques: un bassin supérieur à substrat intégralement précambrien, et au relief accusé; un bassin inférieur à substrat sédimentaire tendre au relief peu accentué qui favorise l'étalement et la divagation des cours d'eau. La limite entre les deux bassins se situe un peu au nord du confluent du Zou et de l'Ouémé.

Le delta de l'Ouémé est situé entre 7°16'N et le lac Nokoué (6°30'N) et 2°15'-2°35'E, en République du Bénin. La zone deltaïque occupe une superficie de 9 000 km² et s'étend sur 90 km le long du fleuve jusqu'à son débouché dans la zone lagunaire de Porto Novo.

2. Climatologie

Les vents sont de SW la majeure partie de l'année. La température de l'air est minimum en janvier, maximum en mars-avril. La moyenne annuelle est d'environ 27°C. La pluviométrie moyenne annuelle est de 1100 à 1150 mm. On distingue une grande saison sèche (décembre à février), une grande saison des pluies (mars à juillet), une petite saison sèche (août), une petite saison des pluies (septembre - novembre). L'évaporation est de 1400 à 1500 mm/an.



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