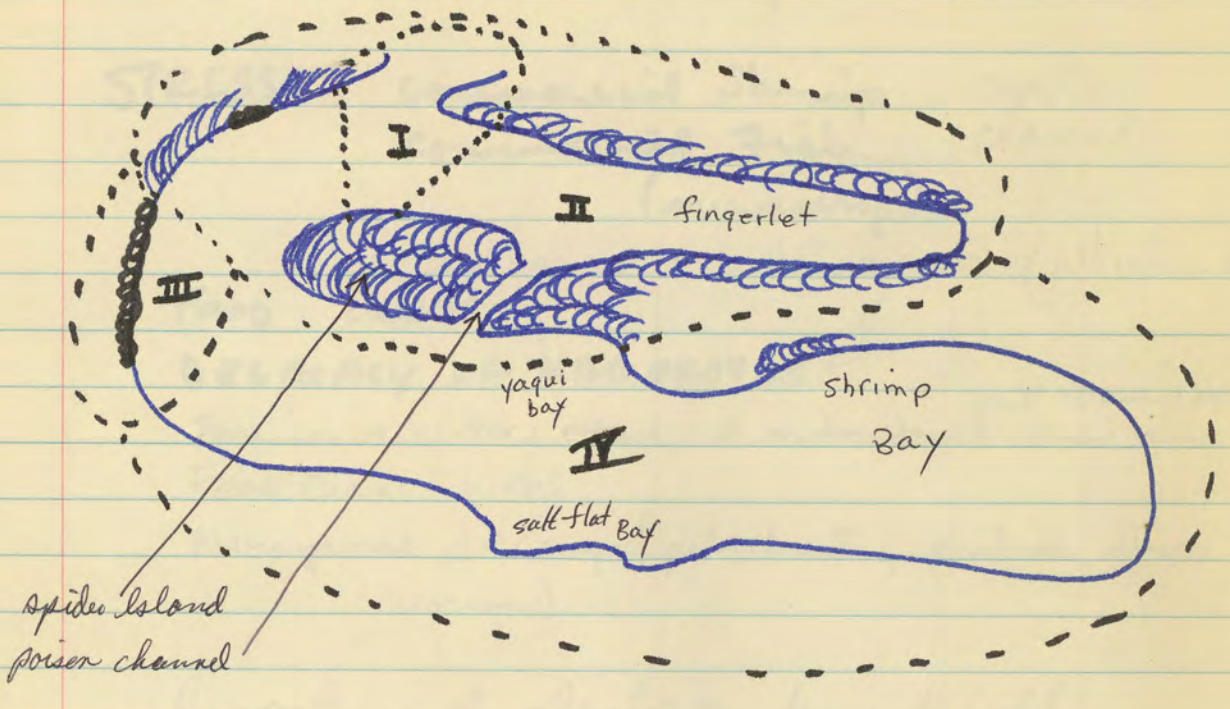
Estero Soldado

1972

BRUSCA
FINOLEY
YENSEN
Thomson
Fee
Houston

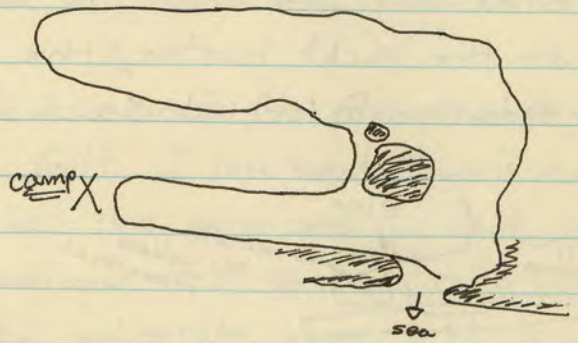


I sandy bay entrance
II Mangrove
III rocky shore
IV muddy shore / bottom

RCB 10XI72

(FRIDAY) NOV. 10, 1972 Mexico
Sonora, Bahía San Carlos,
Estero Soldado (approx.
10 mi. No. Guaymas)

Departed Tucson this ~~A.M.~~ (3 P.M.) for Soldado with Nick Jensen, Bill Fee, Loyd Findley, Roy Houston & Judy Wellman. Had a nice trip down. Arrived Hermosillo ± 9 P.M. and had a few beers at the whore house. It was a nice place although I don't recall the name. It seemed to be patronized principally by young kids. (There was a large fireplace, etc.). Arrived in Estero Soldado around 3 A.M. (Sat.) and sat up camp by small finger.

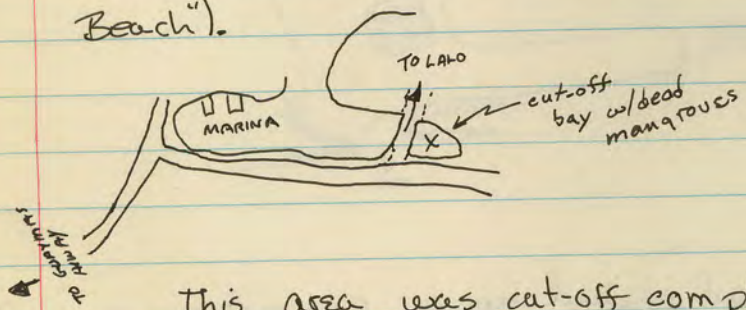


We had picked up a canadian guy named Randy at the border. He came down to Soldado w/us for a few days before hitchhiking on down to Mazatlan to meet some of his friends, from there they are driving on to Central America.

(SAT.) NOV. 11, 1972 MEXICO

Sonora, Bahia San Carlos, Estero Soldado (approx. 20 mi No. Guaymas)

Awoke early to begin work. No formal plans laid out but we want to sample enough of the area, and visit all the parts of the estero to feel we are really familiar with it, enough so that we could sit down and figure out food chains, productivity potentials, impact effects, etc. Had breakfast at the "Creston" motel in San Carlos (good place to eat - in fact, an excellant place to eat. I've had Carne Asada, Mexican food, and Huevos Rancheros there - all very good!). After breakfast we drove by the old mangrove area at the yacht harbor; the part north of the turn-off for Lalo Beach ("Palm tree Beach").



This area was cut-off completly a few years back. The area cut-off was a small but pleasant mangrove swamp. I can recall seeing this area in 1965 (or '66) when Larry Waldrop and I worked the area. What a change - and all due to tarism and exploitation of the

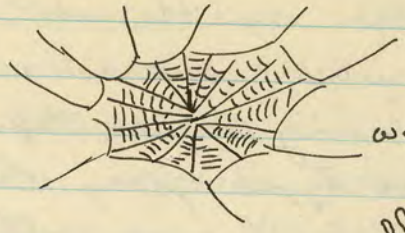
coastline to support it. Anyway, since the Soldado future may go along the same paths as the rest of San Carlos Bay, we thought a view of impounded Mangrove areas would give us the proper setting to begin our own work. It did - we all got depressed and pissed off at seacoast exploiters. The entire area is dead or dying. There is no longer any water circulation at all (so obviously everything would die) and the water is green-brown and mucky. The mangroves (Reds & blacks) are all dead and slowly decaying but instead of being quickly decomposed and reduced by omnivores, borers, etc., they are slowly rotting away by bacterial action; probably aerobic above H_2O and near the surface, and anaerobic within the water. With this picture in mind we proceeded to begin our sampling of Soldado.

Soldado is one of the northernmost mangrove stands in the Gulf. I have heard there is a mangrove swamp at Bahia Kino but I've never seen it. Nick says he remembers the Kino mangrove area to be really large and more of a muddy substrate then Soldado (sounds more like the Topolobampo mangrove region, whereas I would classify the Soldado Mangroves & more closely with the La Paz mangroves; although the latter is really clean and beautiful, the substrate being a white coral sand with only occasional out croppings of mud.).

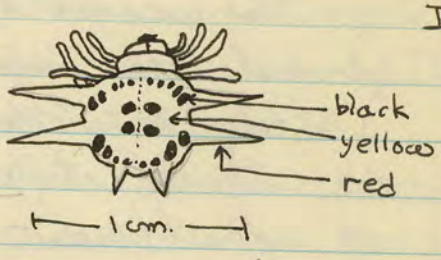
Estero Soldado is really beautiful. the substrate is a sandy mud grading both ways (into pure mud & pure sand) in different regions. The mangroves are all really healthy, the water clear & clean, no H_2S smell is evident & the bottom sediment smells only very faintly of H_2S. Oxygen readings at various places throughout the estero indicate there is no oxygen depletion anywhere (at this time of year anyway); O_2 readings vary from 5-15 ppm; (x = 8-12‰) Water Temp. 15-20° C (shallow pools along shoreline drop at night to about 14° C); salinity was 35‰ (same as open bay), higher in pools of course. Today's work included dropping Roy & Judy off at the far shore to collect rocky shoreline invertebrates. They didn't find much, mostly gastropods, oysters, & small stone crabs (Panopeus?) & Ligia. While they did that Nick, Bill, Randy & I made an expidition into the interior of the large Mangrove Island. It was quite an experience - I've never penetrated that deep into mangrove. One of the most striking things we found were lots of beautiful spiders with brilliant colored abdomens formed into a hard "carapace" with spines along the body margin. If I hadn't seen 'em in the webs I would have thought they were little, weird crabs. Because of their fantastic little

RCB11472-1

creatures we gave this island the name "Spider Island".



web & spider from "Spider Island".

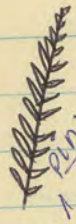


Gasteracantha (elipsoides)? (walckenaer) cancriformis

We followed a small drainage channel into the center of Spider Island to reach the lagoon in the interior, which was really a trip!! We were completely surrounded by Mangrove of all 3 types (Red, Black & Yellow) & the water was very still & quite and an odd sensation of complete aloneness & inner calm came over me. It was very nice. The fauna & flora was the same as elsewhere in the Estero here.

We went back after that to pick up Ray & Judy and stopped to work some on the southern point just inside the entrance to the estero. Here there are mud covered rocks unlike those found anywhere else in the Estero. There is also a cluster of large boulders that cover about 100 ft.^{2} and are in about 2 feet of water at low tide. The flora & fauna on these boulders

RLBC1X172-2



is unique to the region and is probably rare this far north in the Gulf as the rocks were covered with a dense (4"-18") covering of beautiful green Caulerpa of the same type Jerry Barnard & I found on islands in the Souther Gulf (Partida & Espiritu Santo Is.). The stuff was so thick - it was like sitting on a pile of feathers - and was filled with amphipods copepods & small crabs (most spider crabs - Podochela, etc.) I should add this genus of Majids to the shoulbook as I have found them also in Peñasco. They blend in so well with their habitat (Sargassum & Caulerpa) that its more than easy to overlook them. A gallon of this Caulerpa was taken, in fact, to go through back in Tucson.

That wrapped up this days work. As things stand now I feel that I have a good basic feeling of this Esteros. I think I know fairly well whats here and how it operates.

[redacted]

Primary Production:

① Phytoplankton (abundance not yet determined)

② Detritus from spermatophytes

[redacted] Rhizophora mangle (red mangrove)

Avicennia germinans (black mangrove)

Laguncularia racemosa (~~yellow~~ white mangrove)
Salicornia spp. (pickle-weed)
~the "succulent halophytes" of Felger (19)~
salt grasses

③ other vegetable detritus washed into the estero from the open sea (actually Bahía San Carlos) and from desert (desertscrub).

④ macroscopic benthic algae (spiridia, caulerpa, enteromorpha, cladophora) - note: these identifications are still temporary!!

Felger listed the following species of "succulent halophytes" as occurring between the mangroves & desert scrub in San Carlos Bay:

Salicornia pacifica (pickleweed)
Allenrolfea occidentalis (pickle weed)
Atriplex barclayana (salt bush)
Batis maritima (pickleweed)
Maytenus phyllanthoides
Monanthochloe littoralis (prostrate grass)
Sesuvium verrucosum (ice plant)
Sporobolus virginicus (spike grass)
Suaeda torreyana

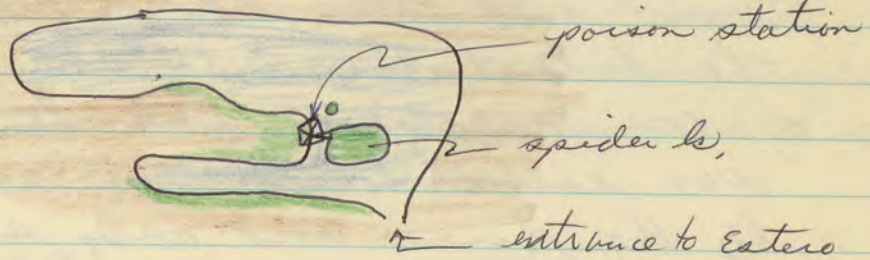
HERBIVORES:

mostly snails - (Stylocheilus longicauda; Cerithidia mazatlanica; Cerithium; Tegula; Turbo ; Bulla punctulata

some fish - (mullet, Mugil cephalus;

(Sun.) Nov. 12, 1972 Mexico
Sonora, Bahía San Carlos,
Estero Soldado (± 10 mi.
No. Guaymas)

RCB12XI72-1 All of us but Roy (slept all day) and Randy (split this morning for Mazatlán) went out about 11 A.M. to do a poison station. This was done at the east end of the channel between Spider Island & Mangroves.



The mangroves were thick here & very well-formed so that we could swim back into them & crawl back into the dense folage picking up fish. Loyd dumped about 1 gallon of "Chem Fish" (rotenone) into the area at high (slack) tide. The rest of us proceeded to swim & climb through the mangroves (reds & blacks & yellows) getting fish as they died. It was a very successful kill with around 30 species being collected,

completely filling a diver can.
The current, even though it was fairly weak, carried a lot of stuff down the channel toward the mouth of the estero, so we collected all the way down.

RCB 12 OCT 72-2 It's very exciting to swim along the edge of the mangroves and watch the Great Blue Herons and Snowy Egrets taking off in slow measured flight, while seagulls, terns and other shore birds fill the distant air with shrill crys of communication. One Scorpaena was collected (although not killed by the poison) and only a couple gobies. Mostly snappers, mojarras and other small silvery fish.

RCB 12 OCT 72-3 After the poison station we took the boat across the bay to the eastern-most shoreline of the estero, north of where Roy & Judy collected bat with a few rocks. We walked around here picking up clam shells, small crabs (Panopeus ?) and gastropods.

This region of the estero shoreline was strewn with middens - the entire area is covered with clam shells. One point was literally a "shingle beach" of pelecypod valves. Most look like Chione although some definitly resembled a Protothaca and one really looked like a Pismo clam (Tivela). There was a camp on the rise above the bank, probably belonging to a Yaqui Indian. In it were a couple hand-made rakes, about 3 feet long, probably used to find clams. Loyd picked-up a lot of stuff here.

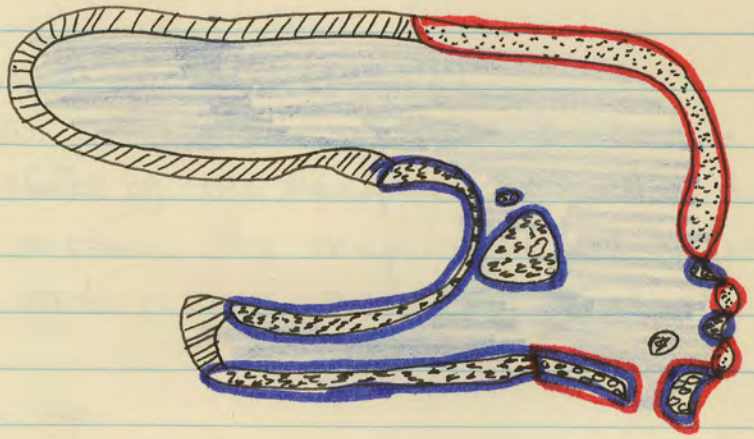
After this we returned to camp to find Manuel Molles had come by to see us (w/ Ruth and) but left before we returned. We felt we had accomplished a great deal so celebrated with sardines, tuna + Ritz crackers, followed by a few beers, a little wine and finally a trip to town. In town we met 4 guys from So. Calif. on their way (by train) to Panama. We played some + visited with them

then went up to see their room in the Casa Grande. The Casa Grande is a fantastic old [redacted] hotel in downtown Guaymas. It is huge, with high ceilings, corridors 15 feet wide, & balconeys overlooking the town on one side and the central garden of the hotel on the other side. Unfortunetly it is very old and in need of repair, but in its day (perhaps 30 or 40 years ago) it must have been one of the most beautiful hotels in Mexico, indeed in the world.

NOV. 22, 1972 TUCSON, ARIZONA

Initial Data compilation of Estero Soldado material

the "Estero"



HABITAT ZONES

= rocky shore

= mangrove

= mud shore

= sand shore

= Caulerpa rocks

Habitats: Mangrove ① epifauna I
② burrowers II

Rocky shore III

mud shore/bottom (infauna IV - epifauna V)

sandy shore/bottom VI

Caulerpa covered rocks VII

Pelagic (fish)

(7 habitat areas)

I. Mangrove - Epifauna (on plants)

Entoproct

growing on mangrove. Species I.D. not possible w/out sending to specialist. Brown, branching form; 1-2".

Goniopsus pulchra

(see II - muddy shore)

Balanus trigonus (Darwin)

filter feeders

a cosmopolitan species - abundant on the stalks of the mangrove as well as any other surface the naupii might have settled down on to - rocks, pelecy pod values, etc.

Ascidia sp.

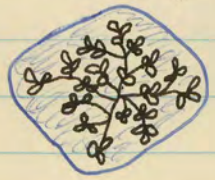
filter feeders

The opaque, solitary ascidians. Uncommon on the roots of the mangrove.

Tunicata:

filter feeder

species 1 - Bright yellow-orange; very abundant on submerged roots and dead wood. Zooids strongly arranged in petaloid pattern, thin.



filter feeder

species 2 - Thick encrusting form, possibly Aplidium; uncommon.

II. Mangrove - burrowers (in plants)

Polychaetes:

Amphinomidae (fire worm) - JK says may be new species. Found uncommonly, living ~~in~~ in ~~wood~~ burrows in the wood of thick, dead mangrove roots. They probably move into burrows of other animals. JK doesn't know of any amphinomid that burrows. The burrow was lined w/ $CaCO_3$

Eunicidae - Living in burrows in thick mangrove root (same as fire-worm above) but burrow not $CaCO_3$ lined.

Mangrove burrowers

Teredo sp.
Shipworm - common

~~Lithophaga~~ Lithophaga calyculata (carpenter)

~~Pholas~~ Pholas sp.
w/ $CaCO_3$ tube - small tube o—

? = O— large tube

III. ROCKY SHORE

Tetragrapsus jouyi (Rathbun)

Scavenger

Note: there may be two species of crab in this jar (jar 1 & 2) - they are nearly identical.

Scarce but present on roks along shore and also [redacted] on sandy beachs near vegetation. Seem to come out and about as the sun approaches & passes beyond the horizon. I'm not sure but I suspect these guys (also Ocypode) are scavengers.

Pachygrapsus transversus (Gibbes)

Scavenger

Uncommon but present in same habitats as T. jouyi (above). Probably omnivores, both predacious and scavenging

Ophiothrix spiculata LeConte

Scavenger

rare - few found under large boulders.

Leptodius occidentalis (Stimpson)

Scavenger

common but not abundant under stones in rocky intertidal shoreline. The species of crabs listed here, plus the two Ucas, Ocypode and Goniopsus makes a total of at least 7 species of Brachyura, all important in reducing organic debris & detritus.

III. MUD BOTTOM - INFAUNA

SEA ANEMONE tribe Nynantheae
subtribe Athenaria

A dark purple or black burrowing anemone; a single specimen was found in the fingerlet and subsequently destroyed by improper preserving/fixing techniques.

probably *Cerianthus* sp.

V MUD BOTTOM - EPIFAUNA

Litaspongia sp.

filter feeder

an erect, branching red sponge. stands 1-7" high, sturdy stalks. I.D. by G.J. Bakus (Allan Hancock). Dr. Bakus feels this may be either: ① a new species of a genus [redacted] now known only from the Red Sea & Australia, or ② a branching form of the genus Ophlitaspongia, which is the red encrusting sponge found in Puerto Peñasco. This sponge is especially common in the sea-side finger of the estero. It is an attractive species attached to pelecypod valves or to the mud bottom itself. this species is apparently never exposed, even at lowest tides.

Uca princeps (Smith)

detritus feeder

The common large fiddler crab of the southern Gulf. These crabs are common in certain areas along the muddy shore, especially near vegetation (pickle-weed & mangrove). their large burrows are exposed at low tide and covered at high tide, and are interspersed among Uca crenulata burrows.

III SANDY BOTTOM/SHORE

Ocypode occidentalis Stimpson

Common along the sandy shore near the mouth of the estero & around into San Carlos Bay proper – all along the shore until the houses & hotels start; there they stop. These ghosts apparently can't stand the near existance of Homo sapiens at all. They will no doubt be gone entirely from San Carlos if this hotel is built as this appears to be one of their last holdouts. Live in deep burrows above high water line. (1.5-2.5 ft. deep). I watched them emerging at sunset one night and they would cautiously poke their heads out & look around. If I was within 70-100 ft. (or less) from their burrow they would quickly retreat & simply not come out - even if I held perfectly still. Whether-or-not they recognize my visual image as dangerous or what I don't know but they definetly were very bothered by my presence.

Scavenger

VIII Caulerpa rocks

Muricea sp.

A purple sea fan w/pale zooids. Fairly abundant on these rocks and overgrown with Caulerpa. I wonder if this Caulerpa is seasonal? The gorgonians stood 2" - 7" tall.

Lophogorgia sp.

Another sea fan, pure white, with long slender branches; about 6" tall. Only one individual recovered.

Isopods -

about 4 species .... probably

Cirolana sp.

Paracerceis sp. (2)

Anthuridae

these things will have to wait a while before I can get to them. I want to take my time and do a good job on 'em. I may send the Paracerceis to Iverson at Cal Academy.

Demospongia -

see sponge sp. 2 (mangrove epifauna)

Tunicata -

see Tunicate sp. 2 (mangrove epifauna)

VII (cont.)

Aglaophenia diegensis Torrey

Common but not abundant; this hydroid was found growing in the Caulerpa on the rocks. Stalks are 1-3" tall. It is probably this species although I haven't had time to make slides of the hydrothecum (polyp cup) to count the marginal teeth, but it appears to have less than 9, which is what A. inconspicua and A. pinguis have (the 2 other common Gulf ostrich-plumes).

Ophiactis simplex (LeConte)

the little 6-armed brittle star (although this specimen has only 5 arms). This species is abundant in algal mats throughout the lower Gulf. The single species we collected here seems different from all other O. simplex I remember looking at. The arm bands are black or gray for one thing; and the body is like opaque white crystal; the arm spines are odd-looking. This may be a new species of this genus!!

Styela sp.

the erect, solitary tunicate. This species is tall (9 cm.) & flat (1 cm. x 3 cm.), opaque tan. Quite unlike all the California species.

VII (cont.)

Podochela sp.

A few individuals seen but none collected. Resemble species from Nurse Beach in having really long legs with puffs of hair on the ends, especially on the chelipeds.

Stenorhynchus debilis (Smith)

The little tear-drop crabs were abundant in the Caulerpa and a great many were collected but all were broken into little pieces by the time we got back to Tucson. These guys will have to be collected by hand & killed slowly prior to preservation.

VII (cont.)

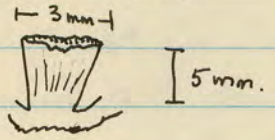
Ophiothrix spiculata LeConte

one individual found this trip but several were noticed in other places in the estero last trip. A typical specimen.

Astrangia pedersenii Verrill

the attractive, semi-solitary, stony coral of the southern Gulf. A clump of 6 polyps was found, although several other rocks had smaller clumps (1-4 polyps) on them.

(largest corallite)

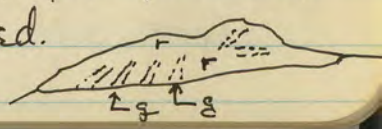


SPONGE – see sponge species 1 (mangrove epifauna)

Tunicata

species 1 – Unlike those found elsewhere, this ascidian is encrusting, red-orange, sort of spongy (in fact it looks like a sponge until you examine it under a scope) and does not have observable zooids. At places it is thin & slimey and at other places it grades into a puffy, spongy structure. The gelatinous matrix is pale green and in streaks through the red.

r = red
g = matrix



V (cont.)

detritus feeders

Uca crenulata (Lockington)
common along mud banks in many parts of estero. (see Uca princeps).

herbivore/scavenger(?)

Goniopsus pulchra (Lockington)
The Gulf "mangrove crab", common & abundant in mangrove areas throughout the Gulf, as well as occurring on rocky shorelines. In both instances it builds burrows into the muddy substrate. In Soldado the burrows are large (1-3" across) and 2-3 ft in length, usually angeling into the mud at about 30°. The burrows are in and around the roots of the mangrove, often mixed among Uca burrows. These crabs seem to emerge at low tide & climb up on the mangroves; I don't know if they are feeding on the mangrove leaves or not, but it is very likely they are. They are rarely seen at high tide.

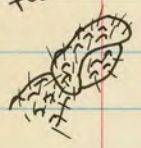
Sepulidae
These little polychaetes (probably 3 species) are abundant on all surfaces (mangroove, rocks, shells, etc.) - much the same habitat as Balanus.

filter feeders

II (cont.)

Clibanarius panamensis Stimpson (?)
Tentative I.D., awaiting word from Jouet Haig. this species is very abundant on the bottom all over the estero and is surely a major reducer-scavenger, playing a key role in keeping the place clean & free of bacterial anarobiasis (H_2S formation). This hermit was found occupying shells from 1cm. to the size of larg Turitellas & Murexes.

scavenger
chelipeds hairy & tuberculate



Penaeus brasiliensis
= P. californiensis, P. brevirostris* (by Schmitt '21, '35)

Young individuals of this species of commercial shrimp are very abundant in the large, land-ward finger of the estero. They were all small specimens (1-4 cm.) and were interspersed among larger specimens (6-10 cm.) of Penaeus stylirostris Stimpson. Both species are obviously using Soldado as a nursury ground. the fact that both species are living together may be explained by the size difference. Perhaps the two differ in food requirements or food-size requirements. They may oscillate through the year - ie. 6 mos. from now P. brasiliensis

✓ 9-10 dorsal teeth
✓ 2 ventral teeth
✓ rostral sulci extends full Carapace length.

bottom detritus feeders

V (cont.)

may be the large ones, P. stylirostris having matured & moved out to sea. This is pure conjecture however, perhaps no explanation of their co-existence is even required!! The significant factor is that this large estero is an important [redacted] nursery and probably one of the few last remaining ones around Guaymas. I have heard people speak of the fishing Pressure on shrimps reducing the population but it seems to me the wiping out of their natural nurseries all along the coast is a more significant factor.

11/11/72 6 cm. P. brasiliensis sound in small fingertel.

Penaeus stylirostris Stimpson
(see P. brasiliensis above)

Callinectes bellicosus Stimpson
The blue crab (swimming crab) - abundant in all parts of the estero. An important predator on small fishs & inverts - possib shrimp of Penaeus! Very few adults seen (none captured) but immatures abunda ½ - 3 cm. wide.

Predator

V (cont.)

Petrochirus californiensis Bouvier

Only one specimen collected. This species is more common in the northern Gulf and on sandy bottoms. In fact, I would call it quite unusual that this species is in Estero Soldado and this one individual may be an accidental wanderer from the open coast of Bahía San Carlos (although the odds of collecting a single individual is extreme!

scavenger

Balanus amphitrite (Darwin)

Abundant on igneous stones along rocky shoreline

filter feeder

(belong in III)

Chthamalus anisopoma Pilsbry

filter feeder

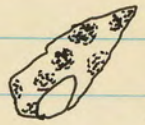
Common on igneous stones along rocky shoreline; mixed with Balanus amphitrite but not as abundant. Both species also on shell fragments along shore and down to low tide level.

Sponge # [redacted] 1-

a white, very thin, encrusting sponge; no spicules obvious; oscula small and difficult to see; easily mistaken for a tunicate. One specimen found growing on a large piece of plastic, partially embedded in mud.

V (cont.)

Bryozoa – Growing on gastropod shell in round, elevated clumps; pure white; somewhat tubular



mag. - 1 cluster

Eurytium albidigitum Rathbun

This large predator on Uca was found to be a common inhabitant of the muddy shores where Uca burrows. Eurytium also burrows, making large holes (± 1.5 inches across) angling down at about 18-28°.

I. (cont.)

Tunicata:

filter feeder

species 3 - Thin encrusting form; dark; zooid not visable. Dark purple in stoH & formalin

SEA ANEMONE (class anthozoa, subclass Zoantharia, order Actiniaria, Tribe *Nynantheae*)

species 1 - a small brown anemone (1-10 m.m. occasionally common in clusters on submerged mangrove roots. They are solitary, w/o acontia, and quite attractive. I.D. must await correspondence with C. Hand or C. cutress.

sessile predator

there.

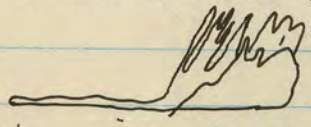
rorg.

g,

Balanus tintinnabulum (Linnaeus)

SPONGES

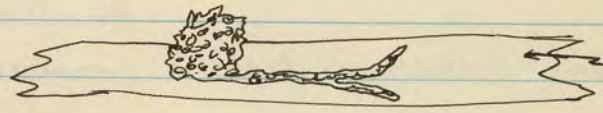
SPECIES 1 - family Cyamonidae (near Cyamon or Trikentrion helium, I think). A robust, brown sponge; solid at the base but forming corragated, folded leaves in the upper 1/2; 3-7 cm. tall, 3-5 cm. wide. Base also spreads out in an encrusting fashion. A weird sponge



a thick spicule blush is evident in patches acr the surface, to 4 mm. tall.

I. (cont.)

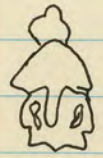
species 2 - A very porous demospongia; thick & mat-like in places (to 3 cm. thick) but sending out narrow fingers in other places; encrustin

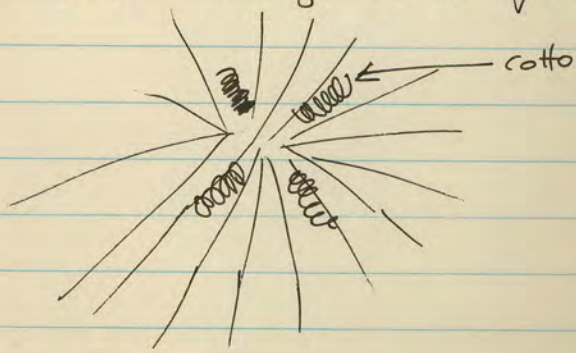


SPIDERS:

Gasteracantha elipsoides (walckenaer)
Abundant throughout Red mangrove areas in symmetrical web. A beautiful spider, described in field notes RCB 11 XI 72. This specie was observed feeding on midges.

Argiope argentata (Fabricius)
A large grey spider in a somewhat symetrical web. The center of the web had 4, pure white, loops of silk, to which the front & back 2 legs were placed

(body) 



I.D. of these spiders was by Dave Richman. He noted both range from So. U.S. to So. America

I (cont.)

Serpulidae -

2 species of serpulid polychaetes.

Membranipora sp.

common; a dark, encrusting ectoproct.

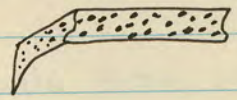
SPONGE SPECIES 3-

A thin, red to red-orange encrusting sponge. Very smooth and almost slimey to the touch. Possibly Ophlitaspongia but I doubt it.

III (cont.)

Petrolisthes gracilis Stimpson
the smooth-armed porcelain crab. Uncommon; under rocks along rocky intertidal of Estero.

Ligia occidentalis (Dana)
Abundant along rocky shore & sandy/mud shore under rocks. No large individuals seen, all 1-2 cm. long. Unusual markings also present on exoskeleton (back & legs), consisting of patterns of black dots; in streaks on back - random on legs.

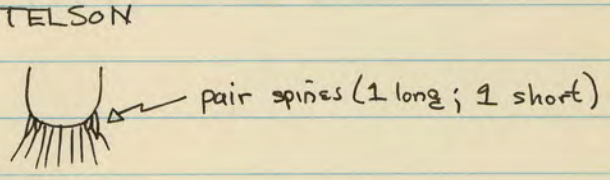


Alpheus sp.
A species of "snapping" or "pistol" shrimp, uncommon under rocks; 1-2 cm long. May be Alpheus normanni kingsley (I collected this species in Guaymas - San Carlos Bay in fact - back in '69 or '70).

Palaemon sp.
Tentative I.D. - 3 small species taken from rocks along rocky shore OR Caulerpa rocks - I don't know which. Telson

III (cont.)

and uropods w/ long posterior hairs.



Panopeus purpureus Lockington
one large individual under boulder, in sandy shoreline.

Panopeus sp.
three individuals from under rocks 8-12 mm. across carapace. This generic I.D. is tentative. Sometimes these little stone crabs of the genera Panopeus, Tetragrapsus, Pachygrapsus, Eurytium, etc. all start looking alike!

Grapsoid crabs #1 & #2
two more different species of grapsoid crabs recovered from under stones along this short stretch of rocky coast. As of this point I have listed 8 species of crabs alone from this isolated, remote, and small rocky area. Amazing!!

III (cont.)

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on rocks; small specimens, < 1 cm. diameter.