

(AHF cat. #1921, 1922)

21 Feb. 1980

COSTA RICA, Puntarenas Province, Golfo de Nicoya, Punta Morales.

- I. South side of Pt. Morales; beach sandy, grading abruptly into fine silt-clay. Numerous, scattered, small, rocky outcroppings, about 300 m. apart. Rocks are consolidated clays, with abundant small barnacle & oyster growth. No algae, ^{except diatoms} (perhaps on minute red?). Low tide -.7' (-.2m) at 12:30 pm. Collections made at water line between 11:00-12:00. Rocks & assoc. mud sediment washed in formalin (2%).

Largest invert seen was Leptodius occidentalis (?). Very few sponges (a few small orange patches). Ocyropsis present on high sand beach. Tidepools 36°C.

No isopods found!! MKW identified a Panopeus bermudensis Ben. & Rath.

- II. North side Pt. Morales, mangrove channel at site of new Univ. Costa Rica marine laboratory. Samples taken from top 1 cm. of fine organic detrital-silt layer,

and from under rocks. Tide pool $T^{\circ} = 37^{\circ}C$ (T° in flowing channel not measured). The mangroves in this particular channel, which extends about 2 km. inland, are only about 5 m tall (R. mangle), as opposed to the 10-12 m giants of most of the Nicoya Gulf. This "scrub" appearance resembles the Gulf of California mangrove lagoons, where a 5 m R. mangle is a large mangrove tree. Claus Gause (a German marine chemist / 1° productivity type here) suggests this stunting may be due to salinity stress. I doubt it. Most of the sediment in this area is covered with a diatom film, brown in the channels; green in & about the mangroves. MKW identified Synalpheas apioceros sanjosei Coutiere & Upogebia (?) rugosa (Lockington) from here. I question the latter.

(AHF Cat. # 1920)

22 Feb. 1980

Costa Rica, Puntarenas Province,
just outside mouth of Golfo de Nicoya,
Tárcoles (Playa Tárcoles). $\approx 9^{\circ}45'N$ $84^{\circ}50'W$.

Beach is dark sand, medium-sized grains, with considerable organic detritus. Isolated rocky points separate sandy stretches. Rocks are small to large, well-embedded in substrate. Several large polychaete colonies, one an onuphid, exist between rocks. Formalin washes taken at low water line of rocks & associated sediment.

- Low tide 0.0' (1:30 pm). Surf $T^{\circ} = 29^{\circ}C$.
Two sample sites: (1) w/o polychaete colonies
(2) w/ polychaete colonies. Both sites had what appeared to be an abundant brown diatom carpet. - note: these samples were accidentally combined! One stomatopod collected (littoral) = Gonodactylus festae Nobili σ (Id. by Ray Manning). Several shrimp taken, including Palaemon ritteri Holmes & Alpheus californiensis Holmes (Id. by M.K.W.).

26 April 1980

Costa Rica, Guanacaste Province,
National Park Santa Rosa. Collections
made on rocky shore outside mangrove
estero. $H_2O T^{\circ} = 26^{\circ}$ (probably an
upwelling area). Rock & turf algal
washes made by Brusca, Mackey,
M. Murillo and Ana Dittle.

Exciroloana braziliensis under rocks set
in coarse mud.

(?) Cirolana sphaeromiformis taken in algal turf washes.

Ophiophragmus sp. (Id by Gordon Hendler).

Shrimp collected & Id by M.K. Wicksten:

Alpheus levinsculis Dana 1 juvenile

A beautiful site, secluded, w/ sandy beaches
rocky shore & mangrove channels all w/in
easy walking distance of one another. Manuel
had a fine time here. I would have
also, under other circumstances!
This site is on the extreme so. base of Cabo
Sta. Elena ($\sim 10^{\circ}48'N$).

27 April 1980

Costa Rica, Guanacaste Province,
Playa del Cocos. Collections made on
rocky point south of town by RSB &
A.M. Mackey. Rock & algae (turf algae)
washes. Tidepool toads seen but not
captured.

Shrimp Id'd by M.K. Wicksten:

Lynalpheus sp. (1 specimen)

Ambidexter panamensis Abele (1 specimen)

Alpheus sp. (2 specimens)

Thor paschalis (Keller) (7 specimens)

Barnacles Id'd by Bill Newman:

Balanus trigonus

Chthamalus sp. 1

Chthamalus sp. 2

Brittle stars Id'd by Gordon Hendler:

Ophiotrix spicalata

Pinnotherid crab Id'd by MKW as
"new species".

13 Aug. 1981

Costa Rica, Puntarenas Province,
Monteverde cloud forest Preserve.

Isopods collected from Heliconia sp. flowers.
Also, millipedes taken from room at Hotel "El
Sitio", in Liberia, Guanacaste Prov. These
small Liberia millipedes are colored exactly
the same as much larger (3"-4") specimens
seen, but not collected, in Monteverde.
Color in life: dark brown or black with
yellow plates on lateral margins of body
segments.

16 Aug. 1981

Costa Rica, Puntarenas Prov., Puntarenas.

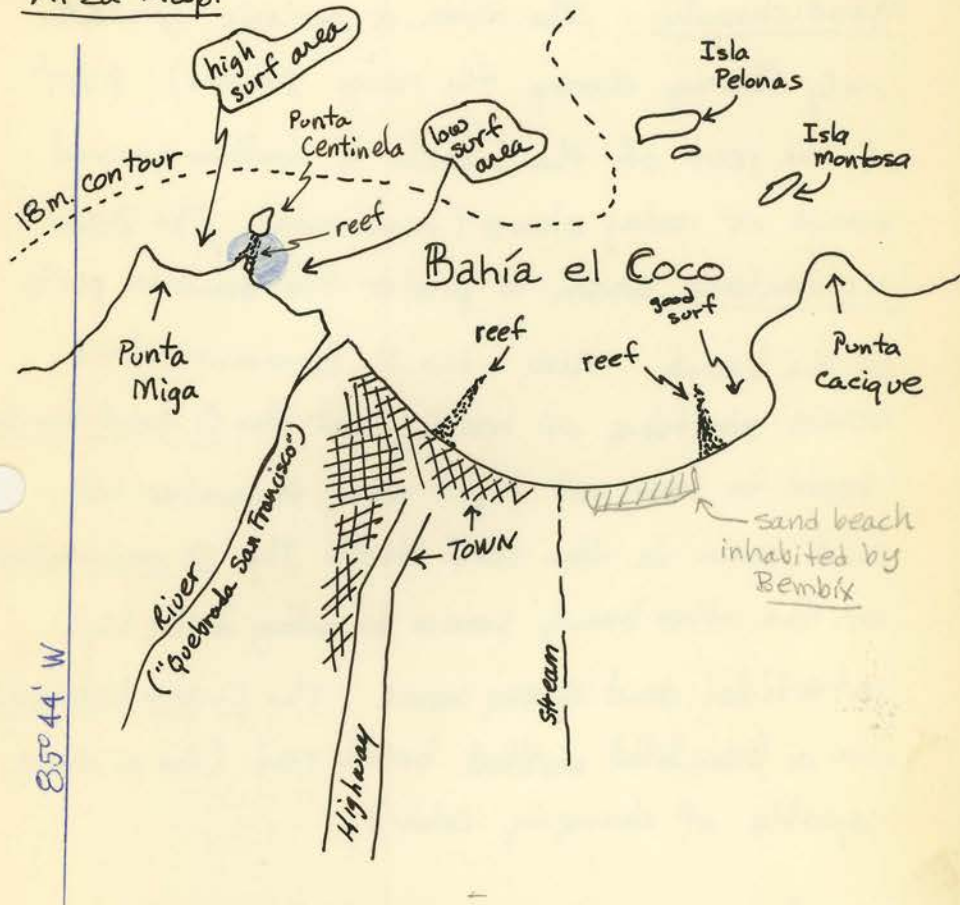
Collections made in mangrove forests along highway going into town. Large crab taken from under log on mud substrate. The roots and trunks of the red mangroves in this region are entirely free of any visible fouling organisms (not even barnacles). Dead mangroves & debris examined for isopods without success.

note: This sample ↑ was probably lost (crab), however, crabs collected later this month at Playas Coco appeared identical (with a distinct pair of light spots on posterior region of carapace).

17 Aug. 1981

Costa Rica, Guanacaste Province,
Playas Coco

Arza Map:



Area description:

This is the same area Spright did his work in (2 papers in Veliger). His paper with the species list provides a good set of place names for the area. By his nomenclature, the tombolo is "Punta Centinela", on the larger "Punta Miga", as

indicated on this map.

The area in front of the river ("Quebrada San Francisco"?) is fairly silty. It is also the area with the most dense population of Ocyrode gaudichaudii. The river is periodic (perhaps only flowing during the rainy season). Most of the rest of the beach is medium-grained sand or rocky shore (headlands). The Ocyrode occidentalis seem to prefer the sandier parts of the beach. Also, the 2 co-occur along some stretches of beach, but the O. gaudichaudii seem to hang out right along the water line, and even in the surf itself. The O. occidentalis, on the other hand, seem to stay in the high intertidal and spray zones. The O. gaudichaudii are a beautiful mottled brick red (the no doubt capable of changing color).

Collections:

Collections were made on Pt. Miga, in the area of the tombolo (indicated in blue on the map). Both general rock washings and specific habitat collections were made.

17 Aug. 1981
(cont.)

Low tide was $\sim +.2$ m (by USGS tide charts). surf $T^{\circ} = 33^{\circ}\text{C}$; tide pools reached $\sim 93^{\circ}\text{F}$; offshore $T^{\circ} = 31^{\circ}\text{C}$ on surface, and 30°C at depth of 3 ft. In collection area (no. side of Pt.) surf was weak, $\frac{1}{2}$ -1 ft. swells, even under constant mild breezes.

In general appearance shore appears sparse, like so many tropical shores. Little obvious algae, although close inspection reveals patches of turf and other clumps of algae; numerous scattered clumps of mussels & Tetraclita (both predominantly on vertical rock faces). Balanoids abundant. Under rock fauna is rich, in contrast to surface fauna. No doubt the surface gets too hot & too dry for much to live on it (except on vertical surfaces!). Under rock fauna consists of numerous kinds of solitary ascidians, encrusting sponges (small), bryozoans, holothurians, Bethellina, Ophiocoma teres, O. alexandri, Ophionereis annulata, gobies, rock oysters.

Rock oyster removed from rocks by locals on N. side of point, but not on S. side. High intertidal region has numerous O. gaudichaudii here, in narrow sand strip above rocks (between rocks and cliff); suggest that where space/resources are limiting, O. gaudichaudii can out-compete O. occidentalis at this latitude. High intertidal also with many small hermit crabs in Nerita & other shells.

Offshore is abundant coral rubble (dead), mostly Pocillopora, and scattered isolated heads of living Pocillopora & Porites. The living Pocillopora heads are small (6" to 1 ft diameter) & not real healthy looking. Many fish, especially Abudefduff and Thalassoma.

Sample #1. Hydroids removed from small tidepool in lower intertidal. Into this jar was also placed a small stomatopod (Gonodactylus?) collected by Phil Pepe from burrow in coral rubble. Labeled #3 in field.

Gonodactylus festae
(Woboli) - id. by
Ray Manning

17 Aug 1981
(cont.)

Sample #2 - labeled #4 in field.

Balanoid barnacles scraped from rocks with knife by Anna Mary Mackey; mid-intertidal. (contains sphaeromatids & snails).

Sample #3 - labeled #5 in field.

Algae scraped from vertical rock face in low intertidal region; strong surge present.

Sample #4 - labeled #6 in field.

Large cluster/mat of tubes; either polychaetes or amphipods! Mat formed a hillock or mound 2 ft. across & 3"-6" deep; lower mid-intertidal region.

Sample #5 - labeled #7 in field.

Another mat of tubes (polychaetes probably; tubes larger than those of sample #4). Pepe says probably Spiochaetopterus sp. The tubes are parchment-like.

Sample #6 - labeled #8 in field.

Living & dead Tetraclita scraped from rocks; mid-intertidal region. (Contains sphaeromatid isopods, a beetle, some spiders (?), & various gastropods).

Sample #7 - labeled #9 in field.

Living & dead oysters scraped from rocks. Some "star-like" limpets were also put into this jar, for McLean.

Sample #8 - labeled #10 in field

General rock washes from mid-intertidal tide pools. Water $T^{\circ} = 93^{\circ}F$. Samples washed thru .05 mm sieve. No formalin used, just sea water and scraping with putty knife.

In addition, an O. gaudichaudii was put in this jar for Garth, as well as a subtidal hermit crab for Haig. Hermit was living on hard rock bottom - not sand.

18 Aug 1981

Costa Rica, Guanacaste Prov.,
Playas Coco.

Same locality as 17 Aug 1981. Collections made at Pt. Cacique, n. end of Bahía el Coco.

Sample #1 - labeled #11 in field

This is a mixed sample, containing the following:

- ① A coenobita sp. from high intertidal and spray zones
- ② A Ligia sp. from high intertidal.
- ③ some amphipods & shrimp collected by Pepe at Pt. Centinela, from coral rubble. There may be an isopod in here from the same region!
- ④ A wasp (?) that digs holes in the sand of the hi intertidal & splash zones.
- ⑤ A porcelain crab & some stomatopods from Pepe's coral rubble collections (Pt. Centinela).
- ⑥ Pepe's basalt rock borrow fauna (from Pt. Centinela), including: a crab, various

Bembix sp. (Sphecidae)
[= sand wasps]. Id. by
Charlie Hauge (ACM)

Stomatopods, pea crabs, "Upogebia-like" shrimp,
Alpheus sp. These critters were living in the
cracks & crevices & holes in the basalt. whether
or not they were creating burrows themselves
isn't known, but I doubt it.

Sample #2 - labeled #12 in field

Four jars (3 small, 1 med.) containing
driftwood with what appears to be Limnoria
burrows. The driftwood on this beach
contains burrow holes of 3 distinct diameters:
(1) minute; Limnoria? (2) medium; unlined,
packed throughout with what appears to be
fecal pellets of digested cellulose! no animals
seen (3) large, CaCO_3 -lined burrows - Teredo?
Sizes are: (1) . (2) . (3) ○ ○

→ no Limnoria found in lab examination
of wood (Feb., 1982; AHF).

19 Aug. 1981

Costa Rica, Guanacaste Prov.,
Playas Coco.

Basalt rock washes made from Pt. Miga. Actually, the "basalt" of this collection & of Pepe's collection of 18 Aug is probably a kind of Olivine or Serpentine. We brought a sample back for Id. Also placed in this jar is a large "terrestrial" crab that is abundant along the sandy beaches here during the night hours; runs along water line like Ocyropsis does! A gravid ♀ crab seen but not taken. Both chelae of the crab that was collected broke off (they were manifestly unequal).

Second sample taken today was wood cut from old stumps of pier pilings on beach, near outflow region of Rio Quebrada San Francisco. No apparent Limnoria burrows seen in wood. (None found in subsequent lab examination either)