and have mistakenly assumed it to be of the glandular type.

The primary sporogenous cells undergo transverse divisions alone resulting in a single row of pollen mother cells (figure 2) which undergo meiotic divisions and produce either tetrahedral (figure 5) or isobilateral tetrads (figure 4). Cytokinesis is simultaneous. The pollen grains are tricolpate and 3-celled at the sheding stage (figure 6) a report contrary to those of Singh and Kaul[4] and Kaul *et al.*[5]

The ovule is unitegmic and tenuincellate. An integumentary tapetum is differentiated at about the time of megaspore tetrad formation (figure 8). It remains uniseriate with uninucleate cells till it is completely absorbed by the endosperm. The single hypodermal archesporial cell functions directly as the megaspore mother cell and undergoes meiotic division producing a linear tetrad of megaspores (figures 7 and 8). The chalazal megaspore is functional and divides thrice mitotically to produce an 8-nucleate embryo sac of the polygonum type (figures 9–12). The antipodal cells are the first to be organised followed by the egg apparatus (figures 11 and 12). The antipodal cells simulate the egg apparatus and remain persistent upto the time of formation of globular embryo in the embryo sac (figures 12 and 13). The synergids are hooked.

Fertilisation is porogamous. Syngamy and triple fusion occur more or less simultaneously. The endosperm is *ab initio* cellular. The primary endosperm nucleus divides earlier than the zygote and is accompanied by a transverse wall resulting in two cells. Later, these divide in all planes forming a massive cellular tissue (figure 14). The zygote divides transversely resulting in two cells the terminal cell *ca* and the basal cell *cb*. The former undergoes a vertical division while the latter undergoes a transverse division producing two superposed cells *m* and *ci*. Thus a four-celled 'T'-shaped proembryo is formed. Further development of the embryo follows the Senecio variation of the Asterad type.

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OCCURRENCE OF LUMINESCENT BACTERIA IN SEDIMENTS

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OCCURRENCE of luminescent bacteria in the sediments is reported for the first time in the Vellar estuary during April–July 1978. The species diagnostic tests of the bacteria revealed the presence of *Beneckea harveyi*, *Photobacterium fischeri* and *P. leiognathi*.

Luminescent bacteria have been isolated directly from sea water at different depths of tropical[1–3], temperate[4] and polar[5] regions. These bacteria are well adapted to exist in free-living[1,3,4,6], saprophytic[7], symbiotic[1,8–10] and parasitic[7,11] niches; however, no earlier report is available on their occurrence from sediments. The present note deals with their occurrence in the sediments and this appears to be the first of its kind in the world.

Sediment samples were obtained from the marine zone (station 1) and gradient zone (station 2) of the Vellar estuary (Latitude 11°30'N, Longitude 79°46'E), Porto Novo (figure 1) between April and July 1978 using a Petersen grab. The samples taken aseptically from the central portion of the mud were transferred into sterile McCartney bottles and were immediately returned to the laboratory. Serial dilutions were prepared and plated on sea water-nutrient agar (SWC) medium containing 3 ml of glycerol per litre of the medium as followed by Hastings and Mitchell[1]. The cultures were grown at 25 ± 2° C. Luminescent colonies appeared on the medium within 24 hr of inoculation when the petri dishes were viewed in dark. After 36 hr of inoculation well separated luminescent colonies were marked on the outer surface of the lower petri dish using a glass marking felt pen. Forty eight colonies were picked up and transferred to SWC-agar slants for later taxonomic analysis.

To identify the bacterial species the procedure adopted by Reichelt and Baumann[12] and Reichelt *et al.*[13] was followed. The results of the tests conducted showed 39 isolates to belong to *Beneckea harveyi*, 5 isolates to *Photobacterium fischeri* and 4 isolates to *P. leiognathi*.

Though 6 species of luminescent bacteria *viz. Beneckea harveyi*, *B. splendida*, *Photobacterium phosphoreum*, *P. logei*, *P. fischeri* and *P. leiognathi* are known from marine environment[14], only *B. harveyi*, *P. fischeri* and *P. leiognathi* have been reported from Porto Novo waters[2,3]. Occurrence of all the 3 species of luminescent bacteria in the sediments of Vellar estuary as in the estuarine water, backwater,

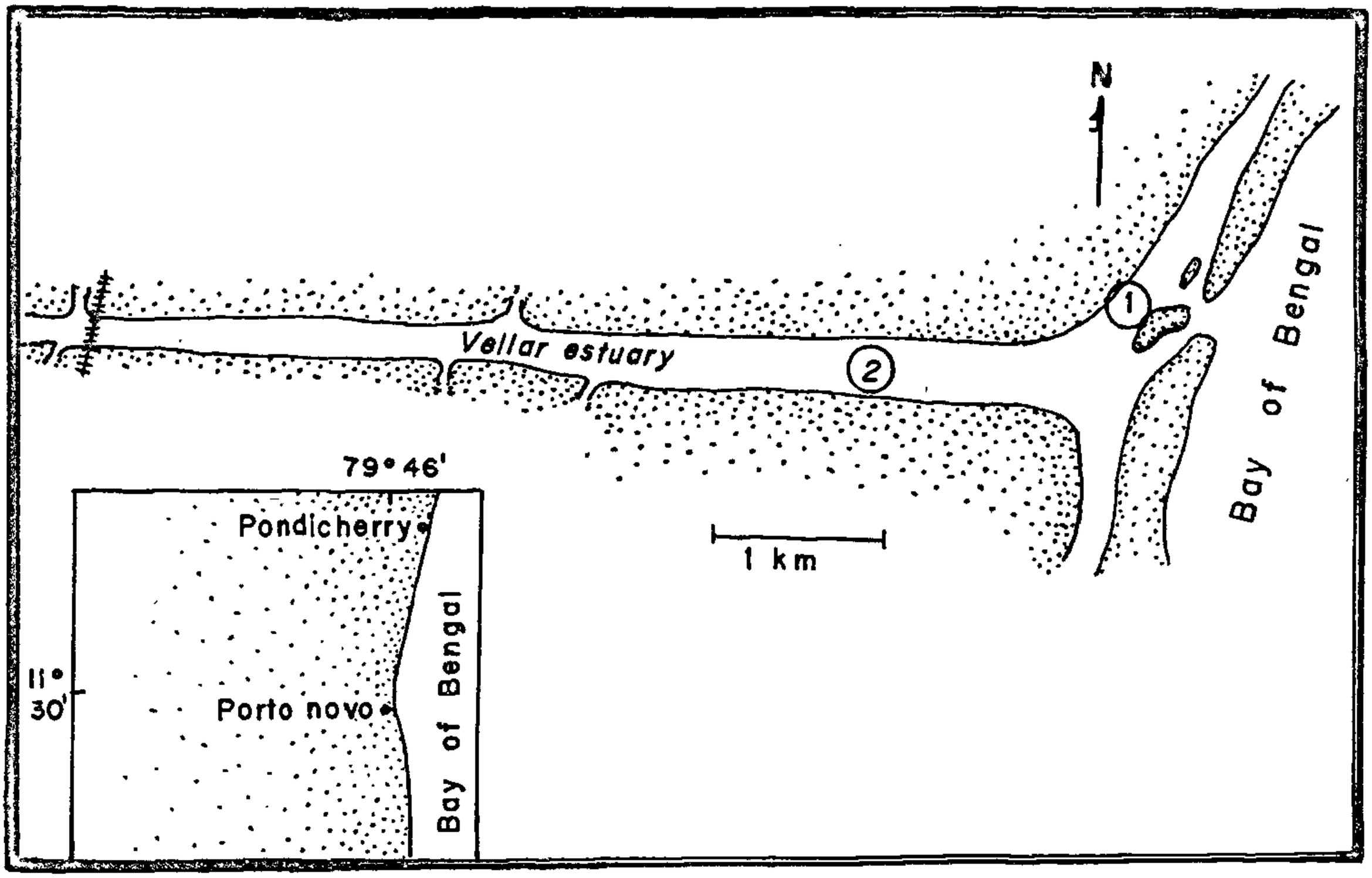

Figure 1. Showing sampling locations.

and adjoining sea and mangrove waters signifies that these environs are suitable for their existence and propagation.

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EFFECT OF THE JUVENOID, HYDROPRENE ON THE OVARIES OF SWEET POTATO WEEVIL, *CYLAS FORMICARIUS* F. (COLEOPTERA: CURCULIONIDAE)

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THE action of juvenoids brings about the disruption of