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The present paper is a preliminary report of the investigation on the luminous organ of *Sepiola birostrata* Sasaki, especially of its symbiotic luminous bacteria. The squid is a species of Myopsids, which is found in the central and northern coasts of Japan.

The materials were obtained at the end of May in Toyama Bay. For the histological study they were fixed with Bouin's solution, embedded in paraffin, cut into sections of 5—10 μ thick, and the sections were stained with the following dyes: Heidenhain's iron haematoxylin-orange G, haematoxylin-eosin, and van Gieson's staining for connective tissue. The isolation of the symbiotic luminous bacteria from the organ was carried out after the following procedures: the luminous organ was taken out from the animal body, washed with sterilized physiological salt solution, removed with a sterilized knife in a sterilized dish, the content was pulled out with platinum needle and smeared on the slant of the nutrient medium (Hattori's nutrient medium for luminous bacteria).

The luminous organ of the squid is a pair of ear-shaped, opaque bodies which are situated on the both lateral sides of the ink-sac; and each of them consists of a luminous-sac, a lens, a reflector and a ink-layer which covers the outside of the reflector. The luminous-sac communicates with the outside by an opening. All these structures of the organ are almost similar with those of *Euprymna morsei* Verrill, which I have previously reported, and so that the details of them will be omitted here.

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Fig. 2. The cross section of the luminous organ. ×20. Stained with Haematoxylin-eosin. g, ink-gland; i, ink-sac; l, lens; o, opening of the luminous-sac; r, reflector; s, luminous-sac; y, ink-layer.

When we take out the content of the luminous-sac and observe it in a dark room, we will find that it emits a beautiful green light. It can easily be recognized under microscope that this luminous substance

Fig. 3. Micrococcus Sepiola n.sp. ×1500. Stained with carbol-fuchsin. a) Smear preparation from the luminous-sac. b) Smear preparation from 24 hours culture on gelatin slant.
is a mass of bacteria. The bacteria are globular or oval in shape, and in a hanging-drop preparation they show no self movement. They are easily stained with usual anilin dyes, but not with Gram staining.

The pure culture of the bacteria was easily obtained. The culture thrived and emitted strong green light at room temperature after 12 hours. All 17 strains obtained in pure culture showed the same morphological, cultural and physiological characteristics. So they should be recognized as one species.

The characters of the species are as following:

1) Morphology. Twenty-four cultures in bouillon and on gelatin:—coccoid forms dominant, usually occur singly, and often in pair; sizes 1.0 to 1.5μ. Agar cultures:—bacillary forms dominant; sizes 1.0 to 1.5μ:

![Fig. 4. Micrococcus Sepiola, n.sp. ×1500. Stained with carbol-fuchsin. Smear preparation from 24 hours culture on agar slant.](image)

2.0 to 2.5μ; usually mixed with long filamentous irregular forms and chains. Motionless. Flagella not proved. Spore and capsule absent. Gram negative. By carbol-fuchsin staining vacuoles are observed.

2) Cultural characters. Gelatin colonies: (a) Surface colonies. Delicate, with spreading, circular with irregular margin and crystals on all around, finely granular, yellowish-white. (b) Deeper colonies. Globular with somewhat irregular margin and crystals on around, finely granular, yellowish-white. Agar colonies: (a) Surface colonies. Delicate, with spreading, circular, finely granular with hyaloid margin, white. (b) Deeper colonies. Globular or spindle-shaped, with crystals


Differential diagnosis: Among all the species of luminous bacteria that are given in literature Coccobacillus Pierantonii Meissner shows the closest affinity with our bacteria. The former is motile and provided with an unipolar flagellum, while our bacteria are motionless. But motility of microorganisms is more or less a variable property, due largely to condition of culture and to particular technique employed; therefore this property should not be emphasized to distinguish these two species. The size of cells of our bacteria is a little larger than that of Coccobacillus Pierantonii. But such a small difference in size is also, as a rule, not great enough to be of much value differential diagnosis. The constant occurrence of the irregular forms of the cells—such as long filaments—on nutrient agar is one of the remarkable properties of our bacteria. But the author of Coccobacillus Pierantonii refers no such property. Levulose is fermented by our bacteria with production of both gas and acid, not by Coccobacillus Pierantonii. The former does not change the litmus mannose medium, but the latter changes it to blue. But these important differences we distinguish our bacteria from Coccobacillus Pierantonii, and recognize it as a new species with the name of "Micrococcus Sepiola, n. sp."