

A Fourth Luminous Millipede, *Dinematocrius* sp.
from Noumea, New Caledonia¹

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(With one Figure)

Record of luminous millipedes are relatively few. According to HARVEY (1952) the old word "Julus" was used not only for millipedes but also for centipedes and therefore the luminous millipedes referred to in the report of luminous millipedes by BRUNNER (1890) were probably luminous centipedes.

KENYON (1893) has referred to BRUNNER's description in his preliminary list of the myriapodes of Nebraska suggesting that the organism in question would be a millipedes, *Fontaria luminosa*, belonging to the family Xystodesmidae. From the description that *Fontaria luminosa* secretes a luminous substance from its pores, I suggest that this organism is not a millipede but actually a centipede.

In contrast to centipedes, which are luminous due to the secretion from their pores, millipedes show a form of intracellular luminescence caused by a luminous substance originated in the cell.

There have been several reports regarding millipedes which emitted light because of infection with luminous bacteria or by eating luminous mycelium of fungi. The luminous millipede which I observed in 1939 on Truck Island, Micronesia, might be the first self luminous millipede ever discovered.

TAKAKUWA (1941) named it *Spirobolellus phosphoreus*, "Kaguya-Yasude" in Japanese. It measured 1.0 mm. in width and 18 mm. in length. The whole body of this animal, with the exception of head, antenna and legs, emits a weak bluish light which becomes brighter upon irritation, but no luminous material was ejected. It is common on Truk Island, where they gather in large-numbers at the base of cocconut trees.

Although the light intensity is no stronger than that of the mycelium of luminous fungi, it can be recognized from a distance.

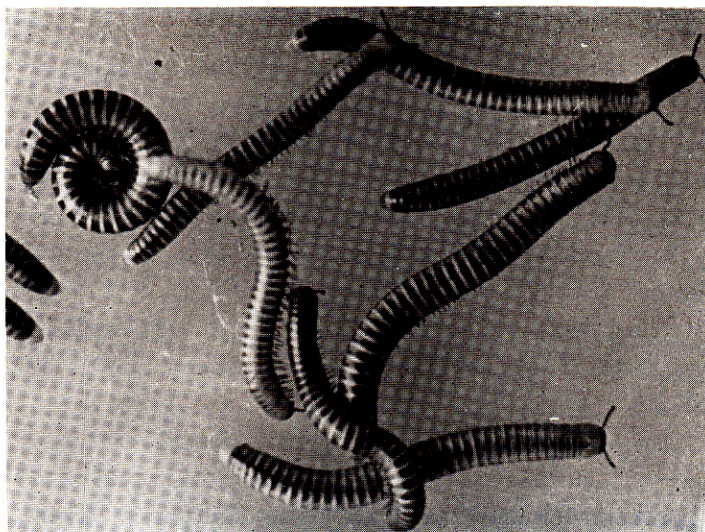
In 1951, LOOMIS and DARVENPORT found a new luminescent species, *Luminodesmus sequoiae* at Camp Nelson, Sequoia National Forest, Tulare Country, California. The whole body surface, the legs, and the antennae of this species glow with a constant bluish white light. A third luminous millipede, *Motyxia tiemanni* CAUSEY of Shirley Meadows, Sequoia National Forest, Ken Country, California was found in 1960 by CAUSEY. This species

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also emits light from the whole body surface, the legs and the antennae with a constant bluish white light. According to CAUSEY the area of greatest concentration is at an altitude of about 6,700 feet, in a deep humus thickly shaded by ferns. The largest male measured 5.6 mm. in width, and about 30 mm. in length; a female measured 6.8 mm. in width, and about 3.6 mm. in length.

After doing cooperative research work under the U.S.-Japan cooperative science program from February to March, 1965, in New Zealand, I had a chance to talk with Dr. R. CATALA, Director of the Aquarium of Noumea, New Caledonia in Noemea.



Luminous millipede, *Dinematocrius* sp. of Noumea,¹ New Caledonia. $\times 2$

According to Dr. and Mrs. CATALA luminous millipedes lived in the enclosure of the aquarium which often emitted light when water fell on them. They told me that any component of urine would make them luminous. We collected the millipedes and observed them in a dark room to see if they would emit light, but failed to recognize any luminescence then. It measured 1.2 mm. in width and 2.0 mm. in length. Returning to my hotel that night, however, I studied 30 specimens of the millipedes and obtained the following results:

- 1) Although the 30 specimens appeared non-luminous in a natural condition, 22 of them turned out to be luminous when irritated
- 2) The luminescence appeared only by chemical or physical stimulation; for example, by pouring water, on the animals, by pushing them with a finger or by stinging them.
- 3) Luminescence continued for only 2 to 3 seconds and was not a constant glow. However, when the animal was continuously irritated with certain chemicals, it should a constant glow lasting for 20 to 30 seconds.
- 4) The luminescence was observed over the whole body surface excepting the legs, antennae and head. The light was bluish in color.
- 5) It seemed that irritations repeated up to 5 or 6 times caused luminescence, but further repetition made the animal cease to emit light.

After an interval of about 30 seconds, irritation again produced luminescence.

6) The duration of luminescence varied in each individual. There were individuals emitted light even on slight irritation, individuals that emitted light only on strong stimulation, and some that never emitted light even when strongly irritated.

7) The luminescence was intracellular; no luminous mucus was ejected.

8) This was evidently self-luminescence, which was not temporary as that caused by infection with luminous bacteria or by eating luminous mycelium or fungus.

9) Mr. Keizaburo SHINOHARA has identified this millipede as *Dinematocricus* sp.

Spirobolellus phosphoreus, *Luminodesmus sequoiae*, and *Motyxia tiemanni* show constant glow, but *Dinematocricus* sp. emits light for 2 to 3 seconds only on irritation.

If the above mentioned *Fontaria luminosa* is not a millipede but a centipede, the *Dinematocricus* sp. is the fourth luminous millipede to be discovered. If *Fontaria luminosa* can be recognized as a millipede it would be the fifth.

抄 録

発光ムカデは多くの種類が知られているが、発光ヤスデの報告は少ない。古い報告では *Fontaria luminosa* の名で発光ヤスデと記載されているが、当時 *Julus* という語がムカデにもヤスデにも使われており、発光状況の記載からも恐らく、発光ムカデと混同されたものと考えられる。

発光ヤスデの最初の報告は恐らく、著者が1939年マイクロネシアのトラック島にて観察、高桑良興博士がカグヤスデ *Spirobolellus phosphoreus* と名づけたのが最初と思われる。第2番目の種類は1951年、LOOMIS および DAVENPORT はカリフォルニアの高山地帯で *Luminodesmus sequoiae* を記録している。第3番目の種類は、CAUSEY が1960年に、カリフォルニアの高原地帯で発見した *Motyxia tiemanni* であるが、同氏は古い記録の *Fontaria luminosa* を発光ヤスデと認め、第1番目の種類とし、*Spirobolellus phosphoreus* を記載していない。以上の3種の発光ヤスデは、体表から明滅のない青白色の光を放つ。発光ムカデは発光液を各環節の両側から分泌するのと大きな相違である。古い記録の *Fontaria luminosa* も発光液を分泌すると記載があるのでヤスデではないものと思われる。

1965年2月から3月にかけてのニュージーランドでの日米科学協力を終えて後著者は、ニューカレドニアのヌーメアを訪れる機会を得、たまたまたヌーメア水族館を訪れ、館長のカタラ博士夫妻と話している中、この水族館の構内に、小さいヤスデがおり、夜間、小便をかけると光るということを聞いた。尿の中の何かの成分により光るとカタラ博士は考えていた。そこでわれわれは、その構内で数種類のヤスデを採集して、実際に光るか否かを確かめてみた。第1図に示す体長20mm、幅1.2mmのヤスデが発光することがわかった。

ただし、前記3種のヤスデは連続的で明滅のない青白色の光を放つのに、本種の発光は刺激を加えた後2-3秒間で軽い刺激のみでよく光る個体と強い刺激でなければ光らぬ個体とがある。発光は全身で、発光液を分泌することはない。発光バクテリアの一時的感染とか発光菌の菌糸を食べたための一時的発光ではなく、ヤスデ自体の発光である。

篠原圭三郎氏は本種を *Dinematocricus* sp. と同定した。本種は第4番目の発光ヤスデと思われる。

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