

深海産管水母マガタマニラ (*Bathyphyssa*) 属の 2 種

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従来 *Bathyphyssa* 属として報告せられた管水母が 6 種ある。即ち、

- 1) *Bathyphyssa abyssorum* Studer, 1878. 海底電線敷設船 Parady 號が北太平洋 (深 1780 尋と 1000 尋) で採集。幹の破片に營養體と生殖體叢各 1 個附着。
- 2) *B. grandis* Fewkes, 1886. 北太平洋海流 (深 3458 米) 後 Siboga 號之と思はれるものを獲、Lens 及 Riemsdijk (1908) *Pterophyssa* 属に移した。
- 3) *B. gigantea* Haeckel, 1888. 南太平洋保護葉破片により記載せし種。圖無く何物か不明。
- 4) *B. grimaldii* Bedot, 1893. l'Hirondelle 號 1888 年アゾーレスの西にて 5 回 (深度最小 1372 尋) 最大 2000 尋、また Princesse Alice 號 1892—1902 年の航海に 8 回 (浅きは 924 米、深きは 5440 米) 採集。但し最良の標品でも、氣胞體と數個の營養體を着生せる幹の上端部のみ。
- 5) *B. sibogae* Lens et Riemsdijk 1908. Siboga 號ボルネオの南 (深 521 米) セレベスの東 (2081 米) 採集。幹に少數の觸手及營養體の着生せるもの。圖解不明瞭。
- 6) *B. sp.* Bigelow 11. Albatross 號 1904—1905 年の航海に熱帯太平洋にて 3 回 (300 尋, 300 尋, 800 尋) 採集。標品貧弱にて査定不能。

私は先年宮城内生物學御研究室の標品を拜見して、わが相模難に 1 新種の産することを知り、後また三井海洋生物研究所標本室に既知種 *B. grimaldii* の完全な標品を發見し、昭和 17 年 10 月、日本動物學會第 17 回大會にその豫報 (動物學雜誌 55 卷 2 號所載) を公表した。本属が *Rhizophyssa* (ボウズニラ) 属に近縁であることは氣胞體の構造から、然しそれとは別科に値することは營養體の形態から、いづれも歐米學者により推定せられたが、幹群の模標等に生殖體叢の状態は全く不明であつた。それがこの 2 標品で残らず判明した。

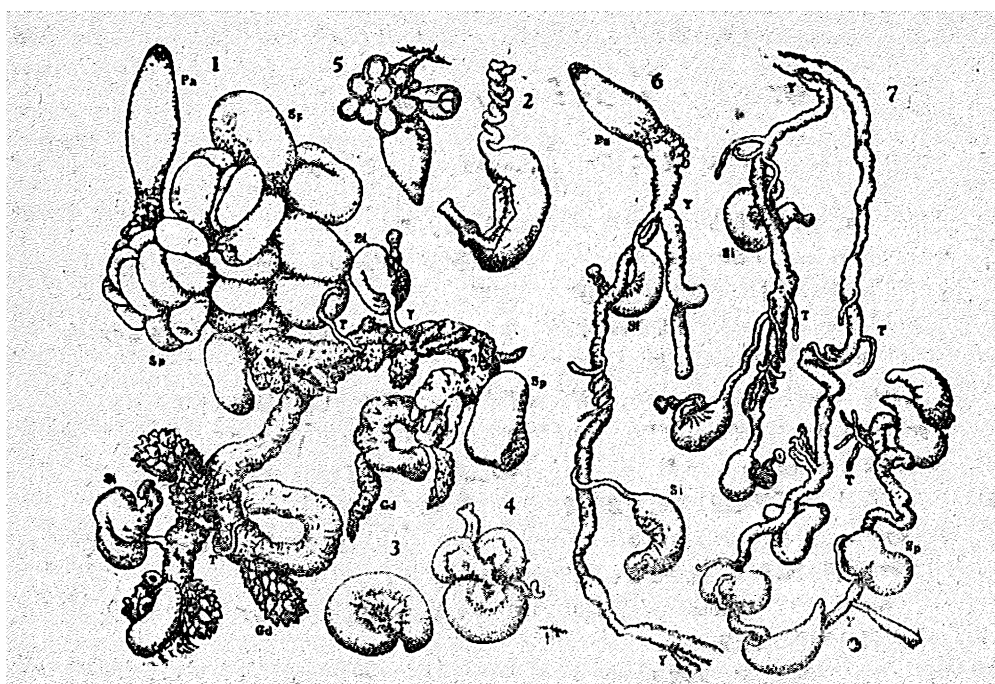
1. *Bathyphyssa grimaldii* Bedot, 1893 マガタマニラ (挿圖, 1—5)

標品採集日時不明、駿河灣戸田沖にて獲られしものならんとのこと。私は昭和 16 年 12 月之を借りて京都に運び、現在京大動物教室に保管中。標品は幹が極度に短縮し且つ捩れた爲に、絲層のもつれた様にからみ合つて居り、特に下方で甚だしいが、營養體の數は數十個に達し生殖體もよく發達、實に完全な標品である。茲に寫眞を掲げ得ないのは遺憾 (歐文報告には添附豫定) であるが、幹の捩れ縮んだまゝを水中で直線に近く伸ばして測つても全長 40 ㎝を超える。外に此の幹から脱離して綫中にあつた個蟲は、營養體 30 個 (内 20 個は鰈形, 10 個は鈎形) と生殖體叢 4 個であつた。次に個蟲各種につき説明する。

A) 氣胞體、長 20 耗最大幅 6 耗の紡錘形、頂上に赤褐色色素の繩せたのが見える。半透明であるが、中に囊下絨毛 (hypocystic villi) の無いことはボウズニラと異なる。

B) 幹は收縮のため所によつて著しく太さが違ふが、廣いところは徑 3 耗を超える。氣胞體に接した上端に芽生帯があり、若い個蟲が多數縱に列ぶ。之に續いて鰈形營養體 (後に説明する) の密生する部位があり、次に生殖體叢の集まる部位に移り、(挿圖 1 は以上諸部を示す) 更に鈎形營養體の群生する部位に移つてゆく。最も注目すべきことは幹が分枝すること、生殖體叢の集合部位で 1 回明らかに分枝してゐる。下方でも分枝してゐるかも知れないが標品がもつれてゐて判らない。

C) 營養體は二次的に變形して種々の形態をとつてゐるが、(イ) 鰈形程度の最も少い型はその 3 部分即ち細長い柄部、膨れた胃部、筋肉よく發達し末端ラッパ狀に拡がる口部の區分明瞭であるが、胃部が中程で折れ曲つて鈎形となりたる上に、その兩側を包むやうに薄い膜が張られ、中に氣泡を藏する (挿圖, 2)。(ロ) 反對に變形程度の最も多いものは、柄部が短縮又は消失、口部もまた筋層も開口も無く、胃部だけが曲玉狀に彎曲し、且つ兩側に薄膜があつて完全な壺狀となり、中に氣泡を藏する (挿圖, 3)。(ハ) 幹の下方で前記鈎形營養體に交つて着生するものには以上 2 型の間程度のもの即ち壺狀で短柄を備へ又は口部を残



挿圖説明 第 1 マガタマニラ 標品の上端約 $\frac{1}{5}$ 。×1, 第 2 同鈎形營養體 ×1, 第 3 囊形營養體 ×1, 第 4 同上 3 個癒合せるもの, 第 5 生殖體叢 ×4, 第 6 コマガタマニラ 標品の上半部 ×1, 第 7 同上下半部 ×1, Pn 氣胞體, St 幹 Y 同上分枝點の位置, T 觸手, GJ 生殖體叢, Si 鈎形營養體 Sp 囊形營養體。

存するものがある。(二) 而してその間には 2 個が癒合して繭形となつたもの、3 個が癒着したもの(挿圖, 4) も交つてゐる。すべて是等營養體の寸法は一定せず、大小不同で、単一曲玉型のもので長徑 10 耗位から 18 耗位までの差がある。

D) 觸手は枝の無い 1 本の絲で、全管水母中最も簡單なもの、太さは徑 $\frac{1}{2}$ —1 耗、收縮してゐるが概して短らしく、幹上の配列は不規則のやうに思はれる。

E) 生殖體叢はカツラノエボシ、ボウズニラの場合とよく似た構造で、10—20 個程の生殖體が 1 個の生殖感觸體と 1 個の附屬泳鐘とを伴なつてゐる(挿圖, 5)。この生殖體が無数に集合して倒卵形又は長橢圓形(幼者では圓柱狀)となつたものが幹の腹側に不規則に着生し、(ボウズニラのやうに規則正しくは配列されてゐない。下になる程成熟してゐる。このものは幹の上端から降つて囊形營養體の密生部を過ぎた邊りに集まつてゐて、それより以下に見られないことも、本種の著しい特性である。營養體の特徴其他により本種が *Bathypheysa grimaldii* であることは少しも疑無い。

II. *Bathypheysa japonica* Kawamura '43 コマガタマニラ (挿圖, 6, 7)

型的標品一宮城内生物學御研究室御所蔵。本標品に就ては生時の状態が精細に記録せられてゐる。深海管水母の殆どすべてが固定後相當の歳月を経て専門學者の檢定に委ねられるので、採集當時の状況不明なのが例で、本種の如き周到なる取扱の爲されたのは稀有のことに屬し、感服の念を禁じ得ない。採集日時—昭和 15 年 11 月 19 日午前 11 時前後。採集地—相模灣、荒崎の北 73° 西、2.7 哩、水深 80 米の所でドレッジ作業の牽索にからまつて上つて來たもの。本屬の管水母としては最も淺い海中で獲られたものであるが、此時海面に多い暖流性 plankton が認められた由であるから、潮流に運ばれて沖から入り來つたと思はれ

る。生時状態一採り上げられた際は幹の長さ3米に達してゐたが、それ以下は切れて海中に残つた由。色彩は氣胞體の頂點に褐色色素群があり、營養體口部の内腔が緑色、末端開口部が黄緑色、その他はすべて無色透明であつた由。

保存せられてある現状では上端にある氣胞體の下に2回(3回?)分枝した幹があり、最も長い枝を辿つて測ると、氣胞體を加へて全長約23耗である。次に個蟲の形態を記述する。

A) 氣胞體は長さ18耗、最大幅6耗の紡錘形、頂端に赤褐色の色素群がある以外無色半透明。腹下絨毛は見られない。

B) 幹は上端氣胞體に接する部位の腹側に芽田部があるが、幹に向つて右寄りに若い觸手の縦列更にその右に若い營養體の縦列がある。芽田部を過ぎて間もなく第1回の分枝があり(挿圖, 6)、その太い方は切斷せられて居るが、細い枝では約80耗行つて第2回の分枝が起る。外に最終端から約50耗遡つた所で第3回の分枝かと思はれる枝があるが直ぐに切れ居るので稍不明確である。

C) 營養體は總數11個が残存するが、其中5個が鈎形で開口部と長柄とを備へ他の6個が曲玉形即ち囊形で、完全に氣胞體化してゐる。而して前種の場合と反對に、鈎形が上方に囊形が下方に着生してゐる。なほ終より數へて3番目と5番目の囊形營養體は2個が癒合して囊形となつたもの(挿圖, 7)。

D) 觸手は前種と同じく簡単な1本の絲で、前種よりも細く且つ短い。配置は不規則で、數が少い。

E) 生殖體叢は一つも着生してゐない。時期の關係かも知れない。本種は前種に比してすべてが小形であること、營養體の形及着生位置が異なることで、明かに別種であり、歐米學者の記載した種で之に一致するものは一も無い。

概括的考察 1) 以上2種の良き標品によつて *Bathyplysa* 屬の特徴が明瞭となり、他屬との類縁も確定せられた。

2) 營養體の無柄有柄を以て *Pterophyssa*, *Bathyplyssa* 兩屬を分ける *Leens* 及 *van Riemsdijk* 兩女史の考は誤である。

3) 主幹が分枝し得る事實は從來難問とせられた構造の解説に大なる示唆を與へる。例へばバレンクラゲ *Physophora* やヤウラクラゲ *Agalma* の觸手を、水母の口縁にある觸手と相同のものと考へずに、幹の分枝を考へ、その上に並立する刺胞叢を個蟲の1種と見做す可しといふ私の主張の正しさを裏づけるのである。

4) 2個以上の個蟲が結合し得る事實も頗る重要である。例へばカツラノエボシ *Physalia* の觸手は他の管水母の様に營養體と同伴せずに感觸體の基部から出てゐるといふ難問題も、觸手が或時は營養體と、或時は感觸體と結合するといふだけのこと、コボウズニラ *Rhizophysa filiformis* では營養體と生殖體叢とが結合してゐると考へればよいといふ年來の私の主張を立證する。

5) ボウズニラ屬では氣胞體だけが浮漂を擔當するが、本屬では幹が分枝して複雑となり、氣胞體だけでは支へ切れ無いので、營養體が二次的に變形して浮漂の役目を分擔するやうになつたと解せられる。

お 願 ひ

本會への御通信は總べて東京大學理學部動物學教室内に願ひます。東京文理大のほうの分室は昨年末限りで廢止になりました。庶務幹事は毎週木曜に事務所に聯絡に行きますが、急用の場合は同人の勤務先東京都鎌谷市南平瀬町山崎成順研究所のほうにお傳へ願ひます。

會費のお拂込などは現状では振替貯金によつて下さるのが便利です。口座番號は東京495番日本動物學會、其の際加算を要する拂込料金は150銭に値上になりました。からそのお積りで。會費をどこまで拂込んだか不明の御方は葉書で幹事まで會照會下されば早速會通知致します。

庶務兼會計幹事

Two species of bathypelagic siphonophore genus *Bathyphysa* "Magatama-Nira"
Zool. Mag. Tokyo **55**, 80-82; 1947.

11/14/99 translated by M. Toyokawa. Amended by P.R.P. Oct. 2007.

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Six species of *Bathyphysa* have been described, namely:

1) *Bathyphysa abyssorum* Studer, 1878. Obtained by the submarine cable-laying boat "Faraday" in the N. Atlantic Ocean (depth : 1780 and 1000 fathoms). A single siphon and a single gonodendron interlaced with a piece of the stem.

2) *B. grandis* Fewkes, 1886. From the Gulf Stream in the N. Atlantic Ocean (depth : 3458 meter). Later the "Siboga" collected another specimen purported to be identical to this. This species was transferred to genus *Pterophysa* by Lens and Riemsdijk (1908).

3) *B. gigantea* Haeckel, 1888. Recorded from fragments collected in the S. Atlantic. No illustration was given and it is uncertain what it is.

4) *B. grimaldii* Bedot, 1893. Captured five times by the "Hirondelle" in 1888 west of Azores (depth : minimum 1372 fathoms, maximum 2000 fathoms). Also obtained by the "Princesse Alice" eight times during the voyage between 1892 and 1902 (depth : minimum 924 m., maximum 5440 m.). However, even the best specimen only consisted of an upper portion of the colony with a pneumatophore and a few siphons.

5) *B. sibogae* Lens and Riemsdijk 1908. Caught by the "Siboga" south of Borneo (depth 521 m.) and east of Celebes (depth 2081 m.). A piece of the stem with a few tentacles and siphons. The illustration is unclear.

6) *B. sp.* Bigelow 1911. Obtained three times in the Tropical Pacific Ocean by the "Albatross" during her 1904-1905 voyage (depth : 300 f., 300 f. and 800 f. respectively). All specimens were too poor to be identified.

A few years ago, the author examined a specimen deposited in the Biological Station of the Imperial Palace, and found it to be a new species from Sagami Bay. After that, the author happened to detect a perfect specimen of a known species, *B. grimaldii*, in the collections of the Mitsui Marine Biological Laboratory. I have presented a preliminary report (published in the Zoological Magazine of Japan, Vol.55, No. 2) at the 17th meeting of the Japanese Association of Zoology in October 1942. This genus was supposed, by the European and American researchers, to be closely related to the genus *Rhizophysa* because of the structure of the pneumatophore, but to belong to another genus because of the morphology of the siphons. However, the structure of cormidium, especially that of the gonodendron, had been totally unknown. This became completely clear from these two specimens.

I. *Bathyphysa grimaldii* Bedot, 1893 Magatama-Nira (figs, 1-5)

Collection date unknown. It was stated that the specimen was collected off Heta in the Suruga Bay. The author borrowed and brought this specimen to Kyoto in December 1941, and it is now kept at the Laboratory of Zoology, Kyoto Imperial University. The specimen is, because the stem is highly contorted and twisted, entangled like tangled pieces of thread, especially for the posterior part. However, the number of gastrozooids amounted to dozens and the gonodendra were well developed. It is really a perfect specimen. Although it is regrettable that the photographs cannot be shown here (it will be shown in the report in English), it

measures more than 40 cm in total length when the entangled stem is stretched out so as to be nearly straight in the water. Besides the stem, the zooids, which had detached from the stem and were found in the bottle, consisted of 36 siphons (of which 23 were bladder-like, 13 were hook-shaped) and 4 gonodendra. Each of them are described below.

A) The pneumatophore is 20 mm. in height, 6 mm. in maximum width and spindle-shaped, with some faded reddish brown pigments near the apex. It is opaque and pellucid, and the absence of hypocystic villi in the interior is a character distinguishing this from *Rhizophysa*.

B) The width of the stem differs here and there according to the degree of the contraction of the stem. In the thickest portion it measures more than 3 mm. in diameter. At the upper end of the stem immediately below the pneumatophore, there is a budding zone where many young zooids are attached in a line. Next to this, there is a region where bladder-like siphons (described below) are densely clustered, and at lower regions gonodendra are gathered together (fig. 1 shows these parts) and then the hook-shaped siphons are crowded together. The most remarkable fact is that the stem branches, and it obviously branches once in the region where many gonodendra are attached. Such branching may occur in the lower part, but is hard to confirm on account of the strong contortion of the colony.

C) The siphons are modified or deformed secondarily into various types: 1) The most unmodified form is clearly composed of the three portions, i.e. a long slender pedicular portion, an inflated gastric portion, and a very muscular proboscis with a distal aperture extended like a trumpet. The gastric portion is curved in the middle and takes the shape of a fishing hook. A thin membrane is stretched to enclose both sides of the siphon, and a gas bubble is retained inside (fig. 2). 2) In contrast, in the most modified form, the pedicular region is shortened or has disappeared, the terminal proboscis has no muscle layer and no aperture, while the gastric portion is bent into the shape of a kidney, and there are thin membranes on both sides to form a perfect airbladder-like structure, embracing a gas bubble in its interior (fig. 3). 3) Some siphons situated on the lower part of the stem have shapes representing transitional stages between the above two, the bladder-like type with a short pedicle or a distal aperture. 4) Among them there are some types in which two siphons are united together to form a cocoon-shape, or three siphons united (fig. 4). The dimension of these siphons varies, for instance the diameter of kidney-shaped pneumatophore ranges from 10 to 18 mm.

D) The tentacle is a simple cylindrical filament, the simplest of all siphonophores, 0.5 to 1 mm. in diameter. It appears generally to be short, although it is contracted, and its arrangement on the stem seems to be irregular.

E) The gonodendron is very similar in construction to that of *Physalia* and *Rhizophysa*. It is composed of 10-20 gonophores, with a single gonopalon and a medusoid appendage (fig. 5). Numerous gonophores cluster together in oval or spindle-shaped (or cylindrical when young) forms, and are attached irregularly to the surface of the ventral side of the stem (not arranged regularly as in *Rhizophysa*), and are more mature in lower region of the stem. It is a conspicuous character of this species that these gonodendra cluster next to the point where the bladder-like siphons are attached densely, toward the apical end of the stem, and are not found at lower regions. There is no doubt that this species is *Bathypheysa grimaldii* from the character of siphons and other features

II. *Bathypphysa japonica* Kawamura '43 Ko-Magatama-Nira (figs. 6, 7)

Type specimen - deposited in the Biological Station of the Imperial Palace.
For this specimen, the state of the living specimen is recorded in detail.

This is the shallowest record for *Bathypphysa* ever reported. Presumably it had been carried by the current from offshore, as many warm-current living plankton were observed at the sea surface at the same time. Living condition - It is reported that when caught, the length of the stem reached 3 m., but the lowest part of the colony was broken off and remained in the water. The entire colony was colourless and pellucid except that the apex of the pneumatophore was ornamented with reddish brown pigment, the interior of the siphon green, the distal aperture tinted yellowish green.

At present, in its preserved condition, below the apical pneumatophore there is a stem which branches two (or three ?) times, and it measures in total length about 23 cm. with the pneumatophore when included in the longest branch. The morphology of zooids is described below.

A) The pneumatophore is 18 mm. in length, 6 mm. in maximum breadth and spindle-shaped. It is colourless and pellucid except that there is reddish brown pigment at the apex. There are no hypocystic villi.

B) On the ventral side of the stem just below the apical pneumatophore, there is a budding zone. On the right side of the stem young tentacles cluster in a line, and to the right of them young siphons cluster in a line. Soon, below the budding zone, the first branching occurs (fig. 6), while the broader stem is broken there, in the narrower stem the second branching occurs about 20 mm. below. Besides these there is a stem presumably the third branching representing about 50 mm. of the end of the stem, but it is a little unclear as the branch is broken immediately below the point.

C) Eleven siphons are all that have been left, of which five are hook-shaped gastrozooids with a distal aperture and a long pedicle, the other six are kidney-shaped i.e. bladder-shaped and all have the shape of a pneumatophore. However, in contrast to the former species, the hook-shaped siphons are attached in a more apical region than the bladder-shaped siphons. The third and fifth siphons from the lower end are two siphons united together to form a cocoon-shape (fig. 7).

D) The tentacle is a simple cylindrical filament like the former species, but thinner and shorter. The arrangement is irregular and they are few in number.

E) The gonodendron is missing. This is presumably because of the season. This species is obviously distinguished from the previous one by its lesser dimensions in every respect, and the shape and the region of attachment of the siphons. It does not agree with any hitherto known species.

Conclusive discussion

1) By the study of the specimens of the two species in good condition, the characters of *Bathypphysa* has become clear, and the relationship with the other genus established.

2) Lens and van Riemsdijk's classification of *Pterophysa* and *Bathypphysa*, dependent on the presence or absence of a pedicle to the siphon, is unreasonable.

3) The fact that the stem can branch gives a distinct suggestion as to the explanation of the structure which has been considered to be a difficult problem. It gives proof in the author's opinion that, for example, a tentacle of "Baren-Kurage" *Physophora* or of "Yauraku-Kurage" *Agalma* should not be considered as a homologue of a tentacle on the margin of the manubrium of medusa, but it is really a

branch of the stem. Accordingly each tentillum clustered on it must be regarded as corresponding to an ordinary zooid.

4) The possibility of union of more than two different zooids is very important, too. It proves the author's long-discussed opinion that such a difficult problem, for instance, the tentacle in "Katsuwo-No-Eboshi" *Physalia* is not accompanied by a siphon as other Siphonophora, but attach at the base of a palpon must be regarded as a tentacle sometimes unite with a siphon and in other cases with a palpon. Accordingly, in "Ko-Bouzu-Nira" *Rhizophysa filiformis*, it should be regarded as a siphon united with a gonodendron.

5) While in the genus *Rhizophysa* the single apical pneumatophore serves as a float, in the present genus the branching of the stem rendered the colony complicated, so that it can be considered that the secondarily modified siphons serve as accessory floats.

Explanation of the figures

1 *Bathyphysa grimaldii*. Upper 1/5 of the specimen. x1

2 Same. Hook-shaped siphon. x1

3 Bladder-like siphon. x1

4 Same as 3. United three siphons.

5 Gonodendron. x4

6 *Bathyphysa japonica*. Upper part of the specimen. x1

7 Same. Lower part. x1

Pn. Pneumatophore, St. Stem, Y. Branching point of the stem, T. Tentillum, Gd. Gonodendron, Si. Hook shaped siphon, Sp. Pneumatosiphon.

[P.R.P. - The illustration presumably is virtually the same Pl. VII in Kawamura (1954) with two figures omitted.]