

Agnesia opaca gen. nov., sp. nov.
A Remarkable Ascidian of the Family
Agnesiidae from Moreton Bay,
Queensland

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**ADAGNESIA OPACA GEN. NOV., SP. NOV.
A REMARKABLE ASCIDIAN OF THE
FAMILY AGNESIIDAE FROM
MORETON BAY, QUEENSLAND**

INTRODUCTION

Moreton Bay, Queensland, has previously been found to have a remarkably rich ascidian fauna. It is situated close to the boundaries of the Oxleyan marine region in the south and the Banksian region to the north and provides suitable environmental conditions for species from both these regions (Kott, 1952, 1957, 1962). The following specimens, however, represent only the second* record of the family Agnesiidae outside Arctic and Antarctic regions (Van Name, 1945). They are sufficiently differentiated from all other genera to justify the erection of a new genus.

TAXONOMY

Family AGNESIIDAE Huntsman 1912

Solitary; modified branchial sac with coiled stigmata and reduced longitudinal vessels; alimentary canal on the left side of the body.

**Agnesia himeboja* Oka and *A. sabulosa* Oka 1929 have been described from temperate regions of Japan.

The family was originally established to accommodate the genus *Agnesia* Michaelsen with the alimentary canal located on the left side of the body, the absence or reduction of longitudinal vessels in the branchial sac, and the dorsal lamina represented by languets. Huus (1937) expanded the family to include also the subfamily Ciallusiinae with well-developed longitudinal vessels, on the grounds of its dorsal lamina languets. However, *Caenagnesia* Årnbäck (1938), differing from *Agnesia* only in the smooth dorsal lamina and bifid branchial papillae, indicates a close relationship of species with modified branchial sac but varying conditions of the dorsal lamina. The latter character cannot therefore be depended upon to separate Ascidiidae Herdman and Agnesiidae, and Ciallusiinae Huus must be considered more closely related to the former family.

KEY TO GENERA OF AGNESIIDAE

1. Dorsal lamina with languets 2
 Dorsal lamina without languets *Caenagnesia* Årnbäck 1938
 (Type *C. bocki*; Millar, 1960)
2. Without bifid branchial papillae *Agnesia* Michaelsen 1898
 (Type *A. glaciata*; Van Name, 1945)
 With bifid branchial papillae *Adagnesia* gen. nov.
 (Type *A. opaca* sp. nov.)

Genus *Adagnesia* gen. nov.

Type: *Adagnesia opaca* sp. nov.

Bifid papillae in branchial sac; apertures protected by specialized closing apparatus; dorsal lamina with languets; gonoducts run anteriorly between pole of alimentary loop and body wall.

The genus is most closely related to *Caenagnesia* Årnbäck (*C. bocki* Årnbäck 1938; Van Name 1945, Millar 1960, syn. *Agnesia complicata* Kott 1954) in the nature of the branchial sac, the arrangement of tentacles, and in the presence of short transverse muscles around the borders of both sides of the body. It differs, however, in the very specialized closing apparatus, the course of the gonoducts, and the dorsal lamina. The large number of spiral stigmata in each row is also distinct; however, this is probably only of use as a specific character.

Adagnesia opaca sp. nov.

(Figs. 1-4)

Records. 8 specimens, dredged, $\frac{1}{2}$ ml S.E. Red Beacon, Toorbul Point, Moreton Bay, coll. W. Stephenson *et al.*, 29.x.1962. The species was described as "very common, possibly dominant in this area".

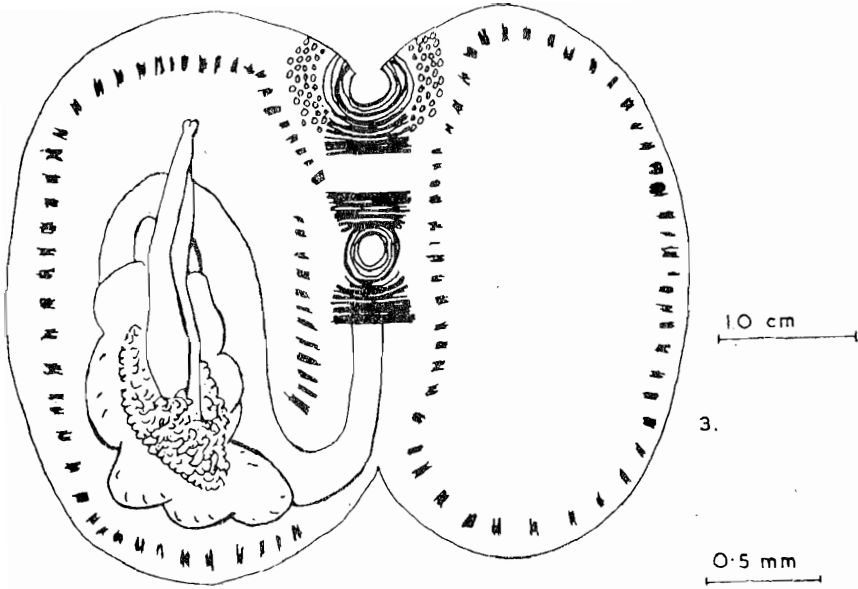
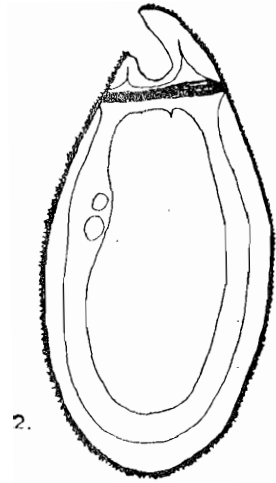
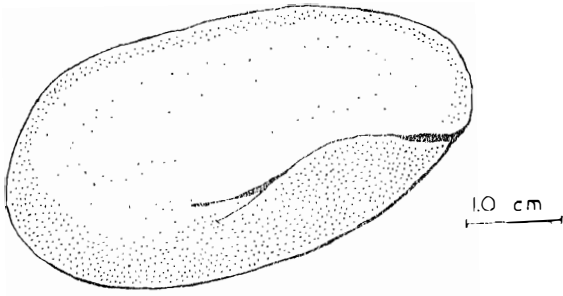
Types. Holotype in Australian Museum, Sydney; 2 paratypes in Queensland Museum, Brisbane; 5 paratypes in the collection of the Zoology Department, University of Queensland.

FIG. 1.—Individual viewed from antero-dorsal aspect.

FIG. 2.—Transverse section through region posterior to branchial opening showing transverse muscles inserted into sandy test at base of folds.

FIG. 3.—Whole animal, divided around ventral surface and viewed through the mantle showing alimentary canal, gonads and ducts, mantle musculature, and base of tentacles around branchial opening.

FIG. 4.—Branchial sac showing spiral stigmata, radial vessels, and bifid papillae.



External appearance (Figs. 1, 2). Laterally flattened, almost round, 4-5 cm long, 3-4 cm wide. Test brittle with sand. Animals lie on the bottom on their right side, with the test slightly thinner on this side of body. Sometimes hairs and fine processes of test to which more sand and mud adheres. Branchial aperture terminal, atrial aperture one-third of distance along dorsal border of body. Both apertures sessile and situated at base of a slit-like depression around anterodorsal border. This slit-like depression is formed by the production of two folds of test, sandy on the outer wall but semi-transparent and naked in the depression. Left wall of fold particularly produced in the region of the branchial opening (Fig. 2) and the right wall of the fold produced in the region of the atrial opening so that the slit or depression in which the apertures are situated presents from the outer surface an open S-shape around the anterior dorsal corner of the body (Fig. 1).

Mantle (Figs. 2, 3). Thin folds of mantle tissue, not involving any muscle, extend up into the test folds either side of apertures. Circular sphincter muscle present on both siphons. Wide bands of short transverse muscle fibres anterior and posterior to both apertures are fixed at either end into the brittle test at the base of the folds, thus providing the mechanism to close the slit. Short bands of transverse muscle fibres also present around the border of both sides of the body, with fibres at right angle to the border.

Branchial tentacles (Fig. 3). Simple, in about 4 alternating series around the aperture. Outermost circle of tentacles the longest and becoming progressively shorter towards the aperture.

Dorsal tubercle. A simple circular opening on a circular cushion.

Dorsal lamina. Represented by about 34 curved languets. To the right of these a flat smooth area of branchial sac without stigmata is present over the rectum.

Branchial sac (Fig. 4). Infundibulae and bifid papillae as described for *C. bocki*, with about 5 turns of each spiral. 32 bifid papillae on each side on transverse vessels correspond to each pair of infundibulae. Radial vessels from transverse vessels present over the coils. About 30 rows of infundibulae.

Alimentary canal (Fig. 3). A double loop. Stomach wider than intestine. Rectum passes anteriorly to base of atrial opening in the centre of body. Anal opening fringed by numerous rounded lobes.

Gonads (Fig. 3). Present on left side only in primary loop of gut. Central ovary fringed by dentritic testes lobes. Testis ducts join in the centre of the ovarian mass and follow the course of the oviduct, dorsal to it. Ducts run immediately anteriorly between pole of the alimentary loop and body wall to open on inner wall of peribranchial cavity. Duct openings anterior to atrial opening, directed anteriorly, vas deferens superficial to oviduct.

Discussion. Specialized opening mechanisms of this type are unusual amongst simple ascidians. In *Rhodosoma turcicum* Savigny a more specialized mechanism is the only similar device known. The present species is also interesting in that the apertures and their protective flaps are so arranged that the incurrent flow comes from the surface of the substrate on which the animal lies, while the excurrent waste materials from the atrial openings are directed into the water above the animal. The gonoducts also provide an unusual feature and a similar arrangement is rare and found only in viviparous forms which the present species will probably be shown to be. These special arrangements of apertures and gonoducts are not present in other species of the present family.

REFERENCES

- ÄRNBÄCK-CHRISTIE-LINDE, A. (1938). Ascidiacea. *Further zool. Res. Swed: Antarct. Exp.* 3(4): 1-54.
- HUNTSMAN, A. G. (1912). Ascidians from the coasts of Canada. *Trans. Canad. Inst.* 9: 111-48.
- HUUS, J. (1937). Ascidiaceae—Tethyodeae—Seescheiden. Kükenthal u. Krumbach. *Handb. d. Zoologie Berlin. u. Leipzig* Bd. 5 Hlfte 2 Lfg. 6: 545-672.
- KOTT, PATRICIA (1952). The ascidians of Australia. I. Stolidobranchiata Lahille and Phlebobranchiata Lahille. *Aust. J. mar. freshw. Res.* 3(3): 205-333.
- KOTT, PATRICIA (1954). Ascidians in Tunicata. *Rep. B.A.N.Z. Antarct. Res. Exped. 1929-31* 1B(4): 121-82.
- KOTT, PATRICIA (1957). The ascidians of Australia. II. Aplousobranchiata Lahille: Clavelinidae Forbes and Hanly and Polyclinidae Verrill. *Aust. J. mar. freshw. Res.* 8(1): 64-110.
- KOTT, PATRICIA (1962). The ascidians of Australia. III. Aplousobranchiata Lahille: Didemnidae Giard. *Aust. J. mar. freshw. Res.* 13(3): 265-334.
- MICHAELSEN, W. (1898). Vorläufige Mitteilung über einige Tunicaten aus dem Magalhaenischen Gebiet, sowie von Süd-Georgien. *Zool. Anz.* 21: 363-71.
- MILLAR, R. H. (1960). Ascidiacea. *Discovery Rep.* 30: 1-160.
- OKA, A. (1929). Eine zweite japanische Art der Gattung *Agnesia*. *Proc. Imp. Acad. Tokyo* 5: 152-54.
- VAN NAME, W. G. (1945). The North and South American ascidians. *Bull. Amer. Mus. nat. Hist.* 84: 1-476.