

Separation of oozoids, phorozoids and gonozoids.

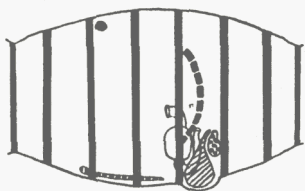
- With 9 muscle bands (or continuous muscle sheet) and dorsal process OOOZOID.
With 8 muscle bands, a vestigial ventral stalk, no gonads PHOROZOIDD.
With 8 muscle bands, no outgrowth, gonads present GONOZOIDD.

Identification of gonozoids and phorozoids.

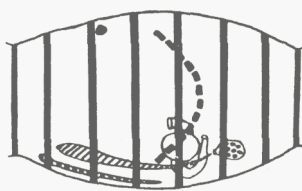
(Classification according to Garstang 1933)

1. Alimentary canal forming an upright U- or S-shaped loop in the sagittal plane sub genus DOLIOLINA.
2. Alimentary canal extended horizontally in the sagittal plane, with a sub-terminal anus..... sub genus DOLIOLOIDES.
3. Alimentary canal forming a close dextral coil in the middle of the cloacal floor with a median anus ... sub genus DOLIOLETTA.
4. Alimentary canal forming a wide dextral arch round the cloacal floor, with anus parietal, on the right side DOLIOLUM (s. str.)

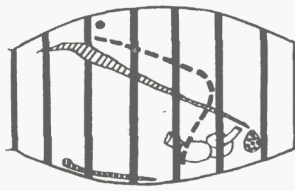
GONZOIDS



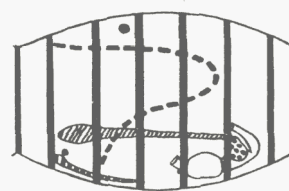
D. (Doliolina) mülleri,
Krohn.



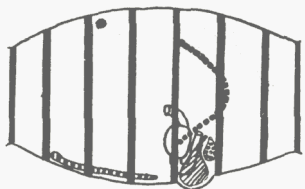
D. (Doliolina) intermedium,
Neumann.



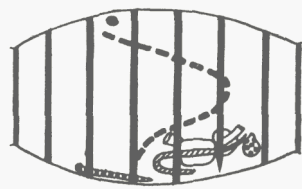
D. (Dolioletta) gegenbauri,
Uljanin.



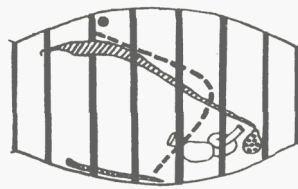
Doliolum (s.str.) denticulu
Q. & G.



D. (Doliolina) mülleri,
var. *krohni*, Borgert.



D. (Dolioletta) mirabilis,
Korotneff.



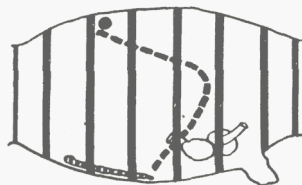
D. (Dolioletta) gegenbauri,
var. *tritonis*, Herdman.



Doliolum (s.str.) nationali
Borgert.

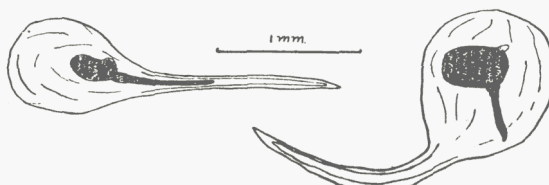
(Diagrams of gonozoids adapted from Garstang 1919)

PHOROZOID



D. gegenbauri, var. *tritonis*
Herdman.

LARVAL STAGES



D. gegenbauri, var. *tritonis*
Herdman.

OOZOID



D. gegenbauri, var. *tritonis*
Herdman.

OLD NURSE



D. gegenbauri, var. *tritonis*
Herdman.

Doliolids have an alternation of generations in their life history. The asexual form (=Oozoid) persists after the total disintegration of the viscera, and it is then known as an OLD NURSE (=Amme). The buds (=Blastozoids) produced by the oozoids develop into three types; TROPHOZOIDS, which remain attached to the oozoid, PHOROZOIDS, which are free swimming but sexless, and GONZOIDS, the free swimming sexual generation. The gonozoids are, in the earliest stages, carried on the ventral outgrowth of a phorozoid.

Species	Alimentary Canal	Gill Lamella			Endostyle		Brain	Testis (gonozoids only)	Length in mm.	Other Points
		Dorsal attach- ment	Post- erior Limit	Ventral attach- ment	Ant.	Post.				
1. <i>D. (Dolioloides) rarum</i> Grobben	Horizontal with sub-terminal anus.	5	5+	5	2 ¹ / ₄	4 ³ / ₄	3 ¹ / ₂	Extends to 3 ¹ / ₃	5	Mediterranean species
2. <i>D. (Doliolina) mülleri</i> Krohn	Upright, U-shaped	5	5 ¹ / ₂	5	2 ² / ₃	4 ² / ₃	3 ¹ / ₄	Forming a ventral hernia	4	10—14 pairs of gill slits
3. <i>D. mülleri</i> var. <i>krohni</i> Borgert	"	"	"	"	2 ¹ / ₆	4 ⁵ / ₆	"	"	7	About 40 pairs gill slits
4. <i>D. (Doliolina) krohni</i> Herdman	"	6+	—	5	2	4 ² / ₃	3 ¹ / ₄	?	—	Atlantic species only? About 25 prs. gill slits
5. <i>D. (Doliolina) intermedium</i> Neumann	Upright, S-shaped	4 ³ / ₄	5 ¹ / ₂	4 ¹ / ₄	1 ³ / ₄	4 ³ / ₄	3 ¹ / ₄	Straight, horizontal, on left side extending to 2 ¹ / ₄	6	Var. <i>restibile</i> has very narrow muscle bands
6. <i>D. (Dolioletta) mirabilis</i> Korotneff	Intestine forming a close dextral coil, with median anus.	2	6 ¹ / ₄	4+	2 ³ / ₄	4 ¹ / ₂	3 ¹ / ₂	Extends forwards to 4 ¹ / ₂ and then turns backwards	?	Mediterranean species
7. <i>D. (Dolioletta) gegenbauri</i> Uljanin	"	3+	5 ³ / ₄	5	2 ¹ / ₂₋₃ / ₄	4 ¹ / ₂₋₃ / ₄	3 ¹ / ₄	Extends forwards and obliquely on left side usually to about M2	9	Testis with great variability in terminal point (M5—M1) and usually crosses M3 (and M2) between the muscle and the ectoderm
8. <i>D. gegenbauri</i> var. <i>tritonis</i> Herdman	"	3+	5 ³ / ₄	4 ¹ / ₂₋₇ / ₈	2 ¹ / ₂₋₃ / ₄	4 ¹ / ₂₋₃ / ₄	3 ¹ / ₄	"	17	"
9. <i>Doliolum</i> (s. str.) <i>denticulum</i> Q. & G.	With dextral arch, anus on right side at M6.	2+	5+(6)	3 ¹ / ₄	2	4	3 ³ / ₄	Extending horizontally and straight on left side to about M2	9	Testis in var. <i>ehrenbergi</i> extends only to M4
10. <i>Doliolum</i> (s. str.) <i>nationalis</i> Borgert	"	2+	5+	4 ¹ / ₂₋₅	2+	4+	3 ³ / ₄	Extending horizontally on left side. Variable length	3+	

(The numbers refer to muscle bands, e.g. 3¹/₄ means situated between muscle bands 3 and 4 but nearer to M3 than M4).

Identification of Old Nurses.

- D. rarum* — Eurymyonic; aclinous.
D. mülleri — (including var. *krohni* Borgert) — Eurymyonic; amphiclinous, myoplane 4¹/₂; otolith usually lost.
D. intermedium — Stenomyonic; aclinous.
D. gegenbauri — (including var. *tritonis*) — Eurymyonic; anticlinous, myoplane 3¹/₂—3; otolith usually retained.
D. denticulum — Holomyonic.
D. krohni (Herdman) — *D. mirabilis*, *D. nationalis*, — unknown.

Definitions:

- Stenomyonic* = muscle bands narrower than 1/2 the interspaces.
Eurymyonic = muscle bands broader than 1/2 the interspaces.
Holomyonic = muscles 2—8 united into a continuous sheet.
Amphiclinous = muscle bands 2—8 in a series gradually becoming broader then narrower.
Myoplane = the position in this series from which muscle bands become narrower, both anteriorly and posteriorly.
Aclinous = muscle bands 2—8 not forming a gradually increasing and diminishing series.

The intestine of oozoids, before desintegration, may be either U-shaped (e.g. *D. mülleri*) or straight (as in *D. gegenbauri* and *tritonis*) but is always median.

Further Information on Identification.

1. *D. rarum*: Garstang, 1933, p. 210, Fig. 3; Grobben, 1882.
2. *D. mülleri*: Uljanin, 1884, pp. 127—130; Fedele, 1923.
3. *D. mülleri* var. *krohni*: Garstang, 1933, p. 214; Ihle, 1927, p. 37 (as *D. krohni*, Herdman).
4. *D. krohni*: Garstang, 1933, p. 214; Herdman, 1888.
The Mediterranean form referred to as *D. krohni* Herdman by Harant et Vernières, Ihle, Borgert, Neumann etc. should read *D. mülleri* var. *krohni* Borgert as the gill lamella does not agree with Herdman's original description (see Garstang, p. 197 and 214).
5. *D. intermedium*: Garstang, 1933, p. 211; Neumann, 1906; Ihle, 1927, p. 37; Borgert, 1901, p. 2 as *Doliolum* sp.
6. *D. mirabilis*: Garstang, 1933, p. 220; Korotneff, 1891.
7. *D. gegenbauri*: Garstang, 1933, p. 216; Uljanin, 1884.
8. *D. trionis*: Garstang, 1933, p. 217; Herdman, 1888, p. 47; Ihle, 1927, p. 38; Borgert, 1901, p. 3, Fig. 3.
9. *D. denticulum*: Garstang, 1933, p. 224; Neumann, 1906.
10. *D. nationalis*: Garstang, 1933, p. 221; Borgert, 1901, p. 4; Ihle, 1927, p. 38.

Distribution	Species Figures in brackets refer to species that only occur exceptionally.
Gulf of Bothnia	—
Gulf of Finland	—
Baltic proper	—
Belt Sea	—
Kattegat	—
Skagerak	—
Northern North Sea	7, 8
Southern North Sea	(10)
English Channel (eastern)	(10)
English Channel (western)	7, 10
Bristol Channel and Irish Sea	—
South and West Ireland and Atlantic	3, 4?, 5, 7, 8, 10
Færoe Shetland Area	(3), 7, 8
Færoe Iceland Area	(3), (7), (8)
Norwegian Sea	—
Barents Sea	—

References to Work on Biology.

Borgert (1901), 3, 5, 8; Delsman (1911), 10; Farran (1906), 5, 8; Fedele (1923), 2; Fraser (1940), 7, 8; Ihle (1927), 3, 5, 8, 10; Korotneff (1891), 6; Lucas (1933), 7; Russell and Hastings (1933), 7, 10; Thompson (1942), 7, 9.

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