

Table IX. Numbers of larvae *Mysis* I–XIII caught in hauls from all depths on stations on which *Amphion* was caught with 4000 m wire or more. The first series in each column indicates the number caught, the second numbers converted to S-200 in 120 min. 0 indicates no catch of *Amphion* in that haul, and open spaces that no haul was taken with that length of wire.

Stat. no.	surface	Wire length m												
		50	100	200	300	600	1000	1500	2000	2500	3000	4000	5000	
3561....	0 0	1 4	6 24	0 0	0 0	0 0	0 0		0 0		0 0	2 8	0 0	Pacific
3676....	0 0	0 0	0 0	0 0	0 0	0 0	0 0		0 0		0 0	0 0	1 2	—
3917....	0 0	33 66	17 34		4 8	6 12	0 0		2 4		3 6	4 8	0 0	Indian
3920....	0 0	20 40	16 32		2 4	0 0	1 4		0 0	1 3	0 0	2 5	0 0	—
3998....	0 0	215 215	158 158		1 1	3 3	1 2	1 1	1 2		0 0	4 8	3 6	Atlantic
4000....	0 0	142 142	1 1		3 3	2 2	1 2		1 2		0 0	1 2	1 2	—
4003....	0 0	0 0	0 0		1 1	0 0	0 0		0 0		0 0	1 2	0 0	—
4017....	0 0	33 66	18 36		1 1	2 4	2 4	0 0	0 0		0 0	0 0	2 1	—
4019....	0 0	19 19	6 6		1 1	1 1	0 0		0 0		1 1	1 2	0 0	—
4180....	0 0	0 0	0 0		0 0	0 0	0 0		0 0		0 0	1 4	0 0	—

The "Dana" catches show a different picture than that suggested by GURNEY for depths between 200 and 500 m. However, it must be remembered, that nearly all "Dana" stations have been taken in late evenings or during night when the shrimp larvae may have taken part in the vertical night migration towards the surface, as known for many plankton organisms. On the other hand my own experience indicates that nocturnal migrations are not so common among planktonic organisms as one may gather from most text-books on the subject. However, also most of GURNEY's material was taken at night, only 10 out of 30 stations were taken at daytime, the remaining ones from late evening or night. But as the "Dana" material consists of not less than 5108 specimens of *Amphion* in Mysis stages, against only 97 specimens in GURNEY's material, I feel justified in concluding that at least at night *Amphion* is living in the uppermost surface layers down to about 30 m depth.

Where *Amphion* occurs at daytime is still unknown, and neither GURNEY nor the present material gives any clear answer. It can only be suggested that during daytime *Amphion* will be found in about the same water layers, except for the first five to six meters from the surface.

Figures showing the abundance of *Amphion* in the different oceans have been calculated and are presented in Table X, where we have the figures converted to the same duration of hauls and the same diameter of nets, i. e., to 120 minutes haul with a net with a 2 m opening, for the three oceans. The figures are given for different depths and as average number of specimens per hauls from stations on which *Amphion* was noted. If we again consider only hauls up to 100 m wire, which as has been shown includes 85% to 92% of the total number of hauls, it appears that in the Atlantic in these upper water layers were caught 65.33 specimens per converted haul. For the Indian Ocean this figure is 37 and for the Pacific 24.67. These figures show that

Table X. *Amphion* larvae (stages I–XIII). Average numbers per haul converted to S-200 and 120 minutes caught by the "Dana" expeditions in different depths.

Ocean	Wire length m												Total
	surface	50	100	200	300	600	1000	2000	3000	4000	5000		
Atlantic	137	44	15	1	1	1	1	1	0	1	0	0	202
Indian	78	20	13	4	3	2	0	0	0	0	0	0	120
Pacific	17	41	16	0	2	1	0	0	0	0	0	0	77
Total	232	105	44	5	6	4	1	1	0	1	0	0	399
Average	77.33	35.0	14.66	1.66	2.0	1.33	0.33	0.33	0	0.33	0	0	132.97
Total...													12.09

Table XI. Total number of *Amphion* Mysis stages caught and measured, both converted to S-200 in 120 minutes.

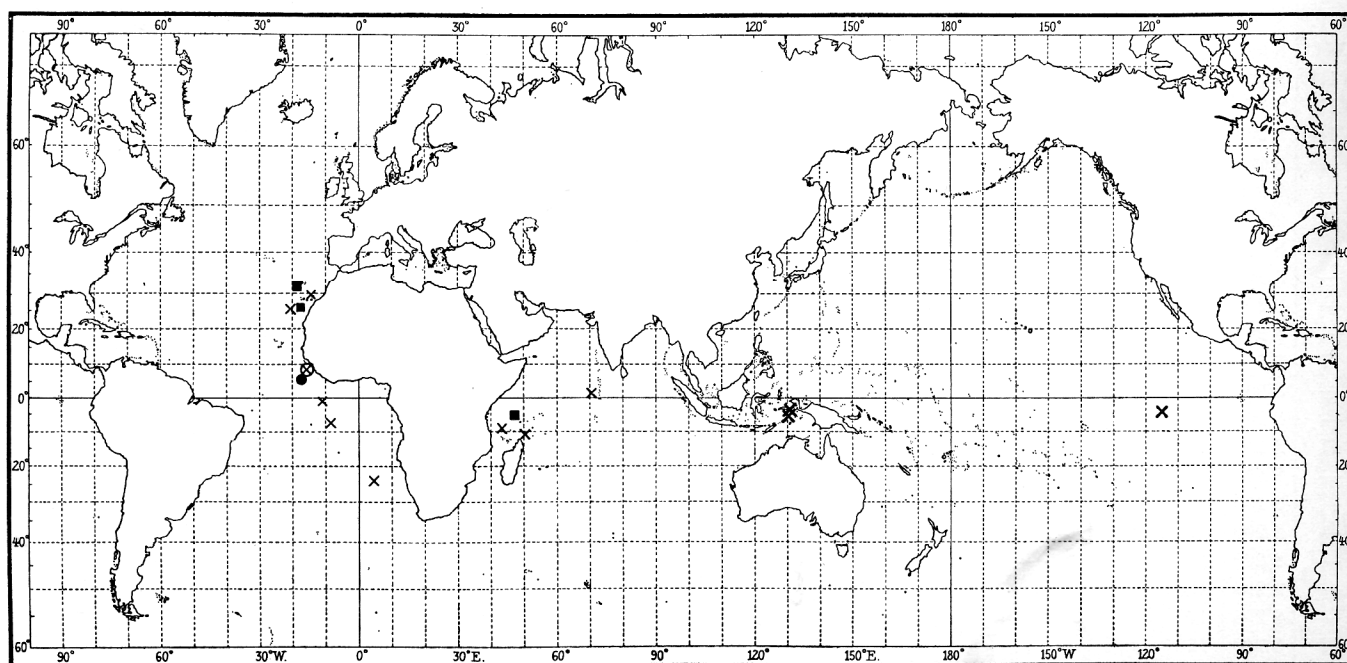
Ocean	caught	converted	measured	converted
Atlantic	1573	5635	1512	3883
Indian	2441	9522	2045	8976
Pacific	1094	4515	929	4050
Total	5108	19672	4486	16909

Amphion is about twice as numerous in the Atlantic as in the two other oceans, slightly less than double compared with the Indian Ocean and nearly three times compared with the Pacific Ocean. The insecurity of these figures must be borne in mind when drawing conclusions from them, especially because the number of actual catches in a surface haul has been multiplied with 384 for giving the converted figure.

But the figures show clearly that *Amphion* is most numerous in the Atlantic Ocean from which area the eastern part along the African coast is best investigated both by "Dana" and "Discovery". Very little is known from the middle of the South-Atlantic as well as from more coastal waters along South America. From the Atlantic Ocean the number of specimens per haul declines through the Indian Ocean and into the Pacific Ocean.

With our present knowledge it is difficult to draw any conclusions from these facts.

In Map II are shown the localities for catches of the postlarva and the adult of *Amphion*, not only from "Dana", but also for all specimens which have been recorded previously in the literature under the name of *Amphionides valdiviae* ZIMMER. Although the finds are relatively few they show a distribution similar to that of the larval form. Most of the catches of the adult and all localities for the postlarva are from the Atlantic. This is explained by the two facts: firstly, as has been shown above, that *Amphion* is twice as numerous in the Atlantic as in the two other oceans; secondly, the Atlantic is the most and best investigated of the three oceans. Therefore, there are good reasons for assuming that the postlarva will in future also be found more abundant in the two other oceans if looked for at the right depths of 2000-5000 m.



Map II. Localities with postlarvae and adult. *Amphion reynaudi*.

⊗ "Dana" postlarva I and II and adult. × "Dana" adult. ● "Discovery". ■ "Valdivia".

The individual numbers of the different larval stages do not provide much information. The numbers of larvae in the early stages are rather low because many of them due to their delicate structure have been damaged or totally destroyed in the net or during preservation and therefore to some extent can have been overlooked in the first gross-sorting of the whole material from the haul. Further, larvae seem to have been less frequently assigned to the uneven stage numbers than to the even numbers, thus in comparison with Stage IX, an extraordinarily large number of larvae have been assigned to stage X. But taken in general the numbers of specimens increase to Stage X and then naturally decrease from then on. The increase caused by spoiled material of young stages, the decrease by the general diminishing of the stock through natural mortality including predation by other organisms.

LISTS OF STATIONS WITH THEIR LARVAL STAGES OF AMPHION

For the pelagic fishery wire length paid out is given in the tables as mw. Further are noted serial numbers of stations and hauls, month, hour for the gear being set, and duration of the haul. For detailed information see the above-cited papers, (p. 5) and the list of abbreviations for types of gear used (p. 6).

In Tables XII-XIV the figures for the actual catches are given and after them with fat types the same figures converted to nearest whole figure (if below 1 raised to one) for S. 200 and duration 120 min.

Some specimens were so damaged that neither their length measurements nor their larval stage could be determined. This causes in some cases the sum of the figures under the larval stages in the tables to be smaller than the figure for the caught number in the haul.

Table XII. Atlantic Ocean. List of material. For positions and other catch data cf. The Danish Dana Expeditions 1920-22 no. 1 and Dana Reports nos. 1 and 26.

St. no.	Month	Gear	Dur. min.	Wire l. m	Numbers		Larval stages													Total									
					caught	conv.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII										
1165-3	XI	S 150	120	600	1	2									1	2									1				
1192-7	XII	S 200	120	100	8	8						2	2		1	1	1	1	3	3	1	1				8			
— 8	—	S 200	120	50	2	2			1	1					1	1										2			
1361-4	VI	S 200	120	100	122	122			4	4	6	6	16	16	26	26	26	26	16	16	9	9				103			
3535-0	VII	S 50	5	sf.	3	1152					1	384									2	768				3			
3539-0	VIII	S 50	5	sf.	4	1536							1	384												1			
3542-0	VIII	S 50	5	sf.	2	768			1	384																1			
3547-3	VIII	S 200	60	100	1	2												1	2							1			
3979-4	II	S 200	120	100	1	1																		1	1	1			
— 5	—	S 200	120	50	4	4													2	2			2	2		4			
3980-11	II	S 150	120	1000	1	2						1	2													1			
3981-2	II	S 200	120	600	1	1													1	1						1			
— 3	—	S 200	120	300	2	2																	1	1		1			
— 4	—	S 200	120	100	3	3																		2	2	2			
— 5	—	S 200	120	50	15	15						1	1		2	2		5	5	2	2	3	3	1	1	14			
3994-1	II	S 200	60	200	6	12					1	2			2	4			2	4			1	2		6			
— 2	—	S 200	60	100	14	28			1	2	1	2	3	6		2	4		4	8						12			
— 3	—	S 200	60	50	13	26									2	4		1	2	4	8		4	8	2	4	13		
3996-3	II	S 150	120	2000	4	8												2	4			1	2			3			
— 4	—	S 150	120	1500	4	8					1	2			2	4										4			
— 5	—	S 150	120	1000	4	8			2	4			1	2												4			
— 7	—	S 200	120	600	5	5							1	1	1	1		1	1	2	2					5			
— 8	—	S 200	120	300	7	7							1	1					1	1	1	1	1	1	1	6			
— 9	—	S 200	120	100	18	18												4	4	5	5	3	3	2	2	14			
— 10	—	S 200	120	50	24	24									1	1		4	4	5	5	7	7	4	4	21			
3997-2	II	S 200	120	600	3	3									1	1					1	1			1	1	3		
— 3	—	S 200	120	300	1	1									1	1					1	1				1			
— 4	—	S 200	120	100	11	11									1	1		6	6	4	4					11			
— 5	—	S 200	120	50	547	547			2	2	2	2	17	17	30	30	56	56	65	65	139	139	103	103	28	28	37	37	516

St. no.	Month	Gear	Dur. min.	Wire l. m	Numbers		Larval stages													Total	
					caught	conv.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII		
4795	VIII	S 200	40	220	2	6												1 3			1
4796	X	S 200	20	220	5	30		1 6		1 6								1 6			3
4797	I	S 200	50	201	2	5												1 2			2
4798	—	S 150	45	201	5	28		3 16										1 6			4
4799	III	S 150	50	201	7	34												1 5	1 5	1 5	7
4802	IV	S 200	25	183	2	10												1 5			2
4811	VIII	S 200	25	183	2	10												1 5			1
4813	IX	S 200	25	183	1	5												1 5			1
4815	I	S 150	45	201	17	96	1 6	4 21		3 16	2 11	1 6			1 6	1 6				1 6	14
4818	VIII	S 150	30	201	11	88						1 8	1 8	1 8	1 8	6 48		1 8			11
4819	VI	S 150	50	201	1	5				1 5											1
4820	III	S 150	40	201	2	12		1 6										1 6			2

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