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LAMPIRAN

Lampiran 1. Data dan hasil uji statistik jumlah somit embrio *O. celebensis*

embrio	ERM		
	fase 19	fase 20	fase 21
A1	4	6	9
A2	4	6	9
A3	4	5	9
A4	3	6	10
A5	4	6	9
A6	4	6	9
A7	4	6	9
A8	4	7	10
A9	4	6	9
A10	4	6	9

embrio	Stasiun 1		
	fase 19	fase 20	fase 21
B1	4	6	9
B2	3	6	9
B3	4	6	9
B4	4	7	9
B5	4	7	10
B6	3	6	10
B7	3	7	9
B8	4	7	9
B9	4	6	9
10	4	7	9

embrio	Stasiun 2		
	fase 19	fase 20	fase 21
C1	4	7	9
C2	4	7	10
C3	4	6	9
C4	4	7	9
C5	3	6	9
C6	5	6	9
C7	5	6	9
C8	5	7	10
C9	5	6	9
C10	4	6	9

embrio	Stasiun 3		
	fase 19	fase 20	fase 21
D1	5	7	9
D2	4	8	10
D3	4	7	9
D4	5	7	9
D5	4	7	9
D6	5	7	9
D7	4	7	9
D8	5	8	10
D9	5	7	9
D10	5	7	9

embrio	Stasiun 4		
	fase 19	fase 20	fase 21
E1	4	7	10
E2	4	7	9
E3	3	7	10
E4	4	8	9
E5	4	7	9
E6	4	6	9
E7	4	7	9
E8	4	7	9
E9	3	7	9
E10	4	8	9

Kruskal-Wallis test	
P value	0.9891
Exact or approximate P value?	Exact
P value summary	ns
Do the medians vary signif. (P < 0.05)?	No
Number of groups	5
Kruskal-Wallis statistic	0.4148

Lampiran 2. Hasil uji statistik detak jantuk embrio *O. celebensis*

Stadia 24

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	44.63

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	-15.45	No	ns	0.0704
ERM (Kontrol) vs. Stasiun 2	-0.6000	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 3	-25.25	Yes	***	0.0004
ERM (Kontrol) vs. Stasiun 4	-35.20	Yes	****	<0.0001

Stadia 25

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	45.95

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	-9.900	No	ns	0.5121
ERM (Kontrol) vs. Stasiun 2	10.05	No	ns	0.4894
ERM (Kontrol) vs. Stasiun 3	-21.55	Yes	**	0.0037
ERM (Kontrol) vs. Stasiun 4	-28.35	Yes	****	<0.0001

Stadia 26

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	44.04

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	-14.95	No	ns	0.0859
ERM (Kontrol) vs. Stasiun 2	1.400	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 3	-24.05	Yes	***	0.0009
ERM (Kontrol) vs. Stasiun 4	-33.90	Yes	****	<0.0001

Stadia 27

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	28.32

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	32.30	Yes	****	<0.0001
ERM (Kontrol) vs. Stasiun 2	15.50	No	ns	0.0645
ERM (Kontrol) vs. Stasiun 3	7.200	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 4	17.00	Yes	*	0.0333

Stadia 28

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	44.10

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	15.45	No	ns	0.0630
ERM (Kontrol) vs. Stasiun 2	9.800	No	ns	0.5023
ERM (Kontrol) vs. Stasiun 3	-11.75	No	ns	0.2651
ERM (Kontrol) vs. Stasiun 4	27.75	Yes	****	<0.0001

Stadia 29

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	31.68

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	-20.50	Yes	**	0.0049
ERM (Kontrol) vs. Stasiun 2	0.9000	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 3	14.90	No	ns	0.0755
ERM (Kontrol) vs. Stasiun 4	-1.800	No	ns	>0.9999

Stadia 30

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****

Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	29.72

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	-24.10	Yes	***	0.0007
ERM (Kontrol) vs. Stasiun 2	-32.05	Yes	****	<0.0001
ERM (Kontrol) vs. Stasiun 3	-12.90	No	ns	0.1811
ERM (Kontrol) vs. Stasiun 4	-10.70	No	ns	0.3871

Stadia 31

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	29.39

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	-18.50	Yes	*	0.0150
ERM (Kontrol) vs. Stasiun 2	-5.250	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 3	0.2000	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 4	15.55	No	ns	0.0594

Stadia 32

Kruskal-Wallis test	
P value	0.0003
Exact or approximate P value?	Approximate
P value summary	***
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	20.85

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	2.050	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 2	2.800	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 3	23.15	Yes	**	0.0013
ERM (Kontrol) vs. Stasiun 4	17.00	Yes	*	0.0331

Stadia 33

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	33.41

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	20.70	Yes	**	0.0053
ERM (Kontrol) vs. Stasiun 2	-9.050	No	ns	0.6419
ERM (Kontrol) vs. Stasiun 3	19.60	Yes	**	0.0095
ERM (Kontrol) vs. Stasiun 4	15.25	No	ns	0.0721

Stadia 34

Kruskal-Wallis test	
P value	0.0001
Exact or approximate P value?	Approximate
P value summary	***
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	23.29

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	8.400	No	ns	0.7245
ERM (Kontrol) vs. Stasiun 2	-11.00	No	ns	0.3196
ERM (Kontrol) vs. Stasiun 3	-7.400	No	ns	0.9550
ERM (Kontrol) vs. Stasiun 4	-19.75	Yes	**	0.0067

Stadia 35

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	4
Kruskal-Wallis statistic	24.29

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM (Kontrol) vs. Stasiun 1	1.850	No	ns	>0.9999
ERM (Kontrol) vs. Stasiun 2	-21.05	Yes	***	0.0001
ERM (Kontrol) vs. Stasiun 3	-5.200	No	ns	0.9439

Stadia 36

Mann Whitney test	
P value	>0.9999
Exact or approximate P value?	Exact
P value summary	ns
Significantly different (P < 0.05)?	No
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	105 , 105
Mann-Whitney U	50
Difference between medians	
Median of column A	164.0, n=10
Median of column B	165.0, n=10
Difference: Actual	1
Difference: Hodges-Lehmann	0

stadia 37

Mann Whitney test	
P value	<0.0001
Exact or approximate P value?	Exact
P value summary	****
Significantly different (P < 0.05)?	Yes
One- or two-tailed P value?	Two-tailed
Sum of ranks in column A,B	56 , 154
Mann-Whitney U	1
Difference between medians	
Median of column A	164.0, n=10
Median of column B	225.0, n=10
Difference: Actual	61
Difference: Hodges-Lehmann	61

Lampiran 3. Data dan hasil uji statistik laju penyerapan kuning telur embrio *O. celebensis*

Embrio	ERM	Stasiun 1	Stasiun 2	Stasiun 3	Stasiun 4
1	0.0034	0.0039	0.0039	0.0033	0.0039
2	0.0034	0.0034	0.0041	0.0041	0.0033
3	0.0036	0.0044	0.0041	0.0035	0.0035
4	0.0036	0.0042	0.0036	0.0035	0.0037
5	0.0036	0.0041	0.0040	0.0041	0.0032
6	0.0035	0.0039	0.0038	0.0037	0.0036
7	0.0032	0.0038	0.0038	0.0037	0.0036
8	0.0036	0.0045	0.0043	0.0034	0.0037
9	0.0036	0.0040	0.0039	0.0039	0.0033
10	0.0032	0.0037	0.0042	0.0032	0.0036

Kruskal-Wallis test	
P value	0.0002
Exact or approximate P value?	Approximate
P value summary	***
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	22.54

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM vs. Stasiun 1	-22.90	Yes	**	0.0016
ERM vs. Stasiun 2	-23.55	Yes	**	0.0011
ERM vs. Stasiun 3	-8.300	No	ns	0.8016
ERM vs. Stasiun 4	-4.000	No	ns	>0.9999

Lampiran 4. Data dan hasil uji statistik waktu penetasan embrio *O. celebensis*

Embrio	ERM	Stasiun 1	Stasiun 2	Stasiun 3	Stasiun4
1	9	10	9	8	8
2	9	10	9	8	8
3	9	9	9	8	7
4	9	10	9	8	8
5	9	10	9	8	8
6	10	10	9	8	8
7	9	9	9	8	8
8	9	10	9	7	8
9	10	9	9	8	8
10	9	9	9	8	8

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	43.12

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM vs. Stasiun 1	-6.000	No	ns	>0.9999
ERM vs. Stasiun 2	3.000	No	ns	>0.9999
ERM vs. Stasiun 3	24.00	Yes	***	0.0003
ERM vs. Stasiun 4	24.00	Yes	***	0.0003

Lampiran 5. Hasil uji statistik gerakan rahang embrio *O. celebensis*

Stadia 34

Kruskal-Wallis test	
P value	0.0116
Exact or approximate P value?	Approximate
P value summary	*
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	12.93

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM vs. Stasiun 1	12.55	No	ns	0.5395
ERM vs. Stasiun 2	-1.700	No	ns	>0.9999
ERM vs. Stasiun 3	-7.650	No	ns	>0.9999
ERM vs. Stasiun 4	-7.700	No	ns	>0.9999
Stasiun 1 vs. Stasiun 2	-14.25	No	ns	0.2865
Stasiun 1 vs. Stasiun 3	-20.20	Yes	*	0.0192
Stasiun 1 vs. Stasiun 4	-20.25	Yes	*	0.0187
Stasiun 2 vs. Stasiun 3	-5.950	No	ns	>0.9999
Stasiun 2 vs. Stasiun 4	-6.000	No	ns	>0.9999
Stasiun 3 vs. Stasiun 4	-0.05000	No	ns	>0.9999

Stadia 35

Kruskal-Wallis test	
P value	0.0063
Exact or approximate P value?	Approximate
P value summary	**
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	14.34

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM vs. Stasiun 1	11.85	No	ns	0.6876
ERM vs. Stasiun 2	-1.450	No	ns	>0.9999
ERM vs. Stasiun 3	-8.600	No	ns	>0.9999
ERM vs. Stasiun 4	-10.05	No	ns	>0.9999
Stasiun 1 vs. Stasiun 2	-13.30	No	ns	0.4108
Stasiun 1 vs. Stasiun 3	-20.45	Yes	*	0.0168
Stasiun 1 vs. Stasiun 4	-21.90	Yes	**	0.0077
Stasiun 2 vs. Stasiun 3	-7.150	No	ns	>0.9999
Stasiun 2 vs. Stasiun 4	-8.600	No	ns	>0.9999
Stasiun 3 vs. Stasiun 4	-1.450	No	ns	>0.9999

Lampiran 6. Data dan hasil uji statistik panjang larva awal menetas embrio *O. celebensis*

Embrio	ERM	Stasiun 1	Stasiun 2	Stasiun 3	Stasiun4
1	4.62	4.61	4.64	4.15	4.21
2	4.78	4.56	4.75	4.27	4.09
3	4.84	4.43	4.73	4.25	4.47
4	4.97	4.24	4.65	4.22	4.11
5	4.99	4.62	4.71	4.21	3.91
6	4.70	4.48	4.68	4.25	4.13
7	4.84	4.84	4.76	4.22	3.97
8	4.83	4.34	4.65	4.48	4.02
9	4.91	4.71	4.72	4.21	3.92
10	4.84	4.02	4.82	4.43	4.32

Kruskal-Wallis test	
P value	<0.0001
Exact or approximate P value?	Approximate
P value summary	****
Do the medians vary signif. (P < 0.05)?	Yes
Number of groups	5
Kruskal-Wallis statistic	37.80

Dunn's multiple comparisons test	Mean rank diff.	Significant?	Summary	Adjusted P Value
ERM vs. Stasiun 1	18.20	Yes	*	0.0209
ERM vs. Stasiun 2	7.250	No	ns	>0.9999
ERM vs. Stasiun 3	27.50	Yes	****	<0.0001
ERM vs. Stasiun 4	34.55	Yes	****	<0.0001

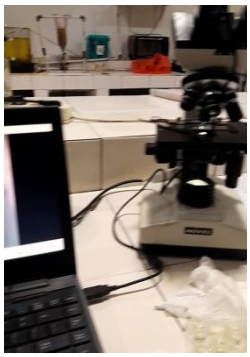
Lampiran 7. Dokumentasi penelitian


(pengambilan air sampel)

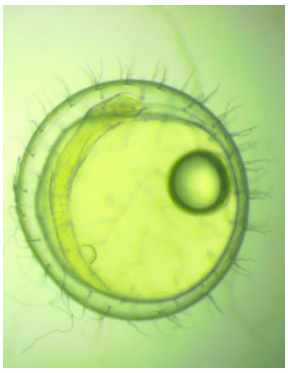

(titik stasiun di Kolam Unhas)

(Pemeliharaan ikan)

(mengaklimatisasi ikan)



(pengamatan embrio *O. celebensis)*



(embrio *O. celebensis)*

(embrio *O. celebensis)*