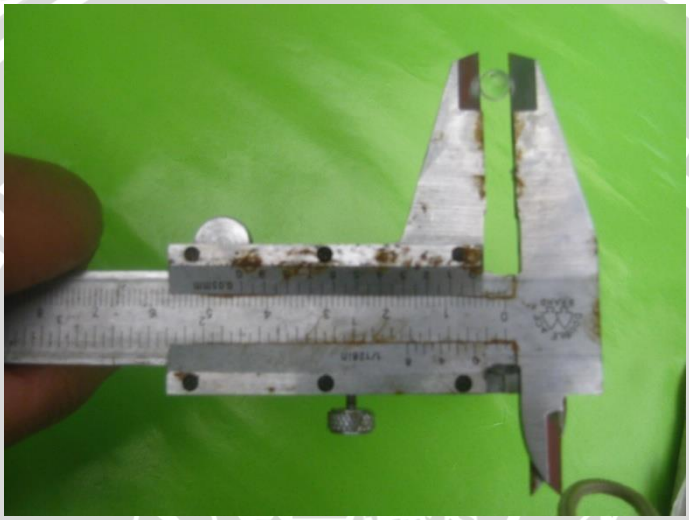
LAMPIRAN

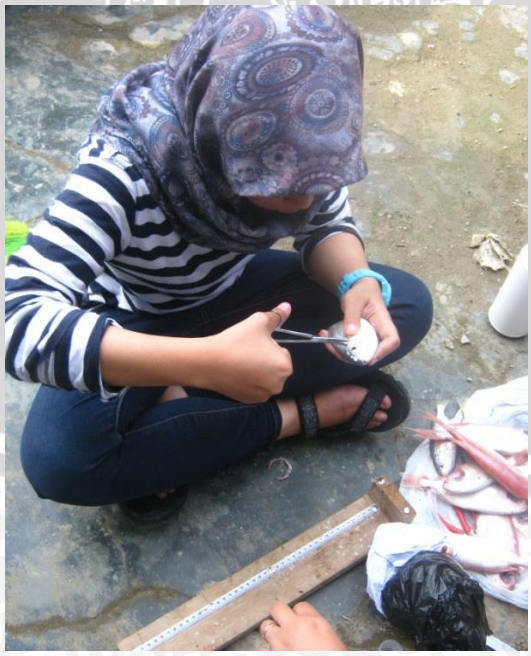
Lampiran 1. Proses Pengambilan Sampel Mata Ikan

Persiapan menuju fishing ground

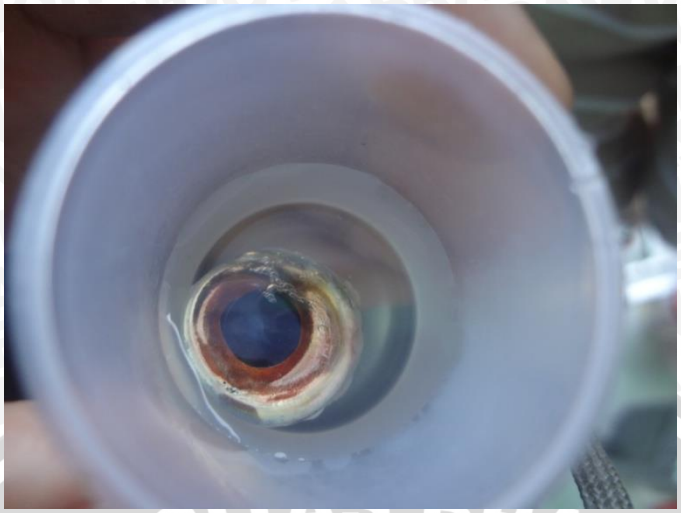
Proses pengambilan sampel ikan di kapal



Proses pengukuran dan identifikasi sampel ikan



Pengambilan sampel mata ikan di darat



Sampel mata ikan dimasukkan ke dalam larutan formalin 15%

Pemberian label pada botol sampel

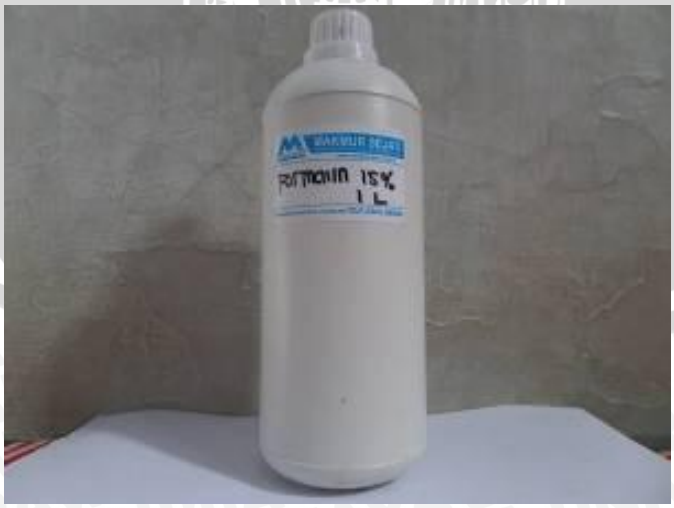
Pengamatan dengan mikroskop

Lampiran 2. Alat dan Bahan

- Bahan

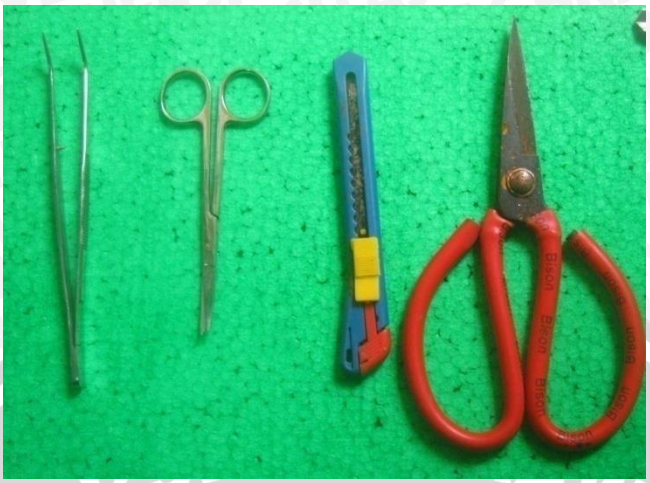
Ikan Gulamah (*Johnius belangerii)*

Ikan Biji Nangka (*Upeneus sulphureus*)

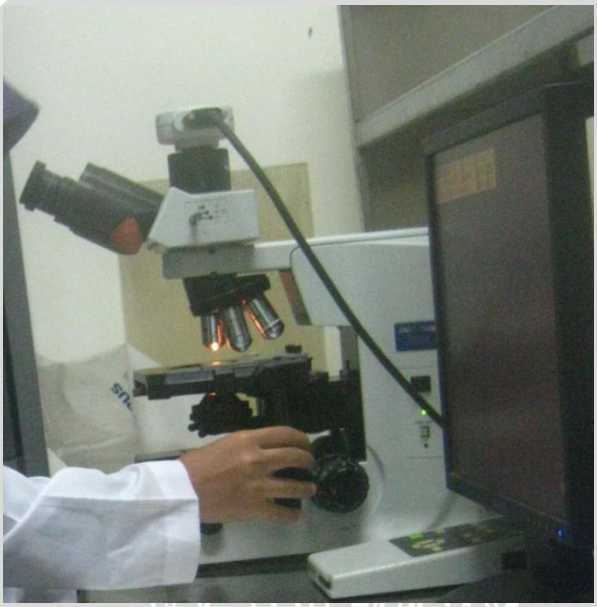


Formalin 15%

- Alat

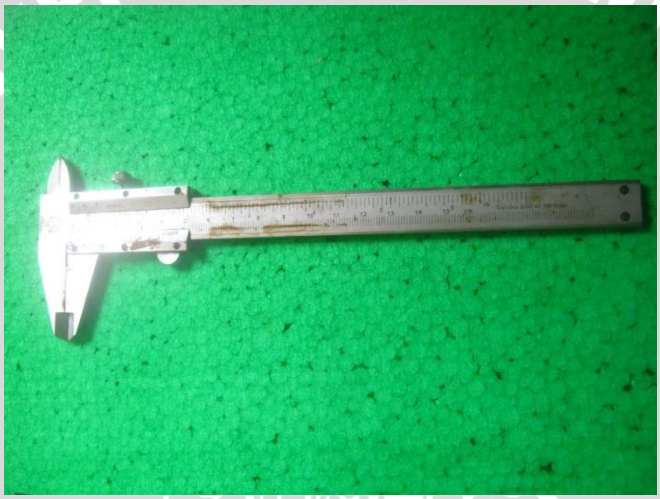


Sectio Set

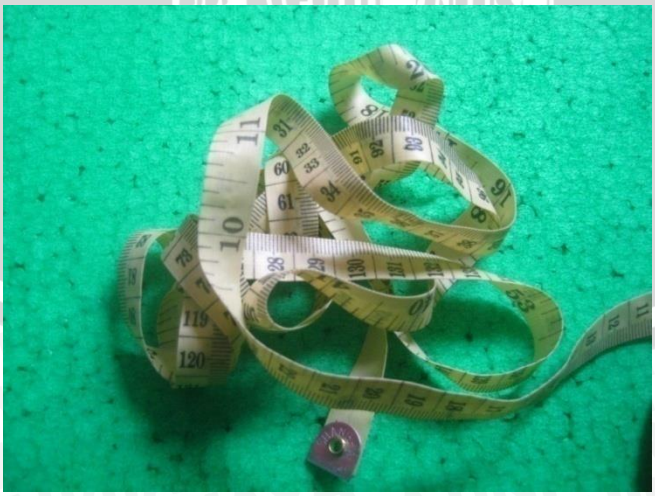


Mikroskop Olympic BX-41

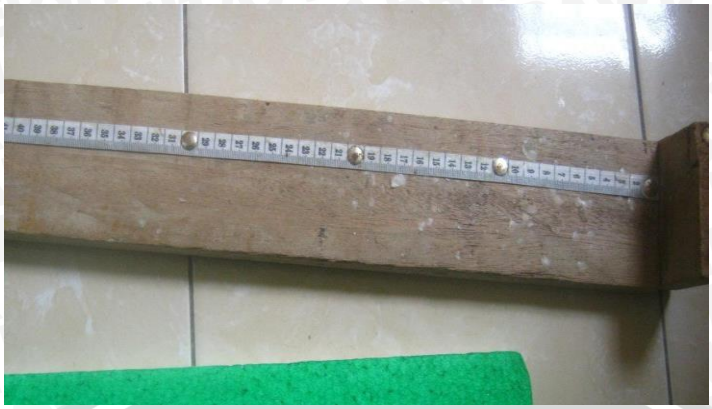
Botol sampel dan kertas label



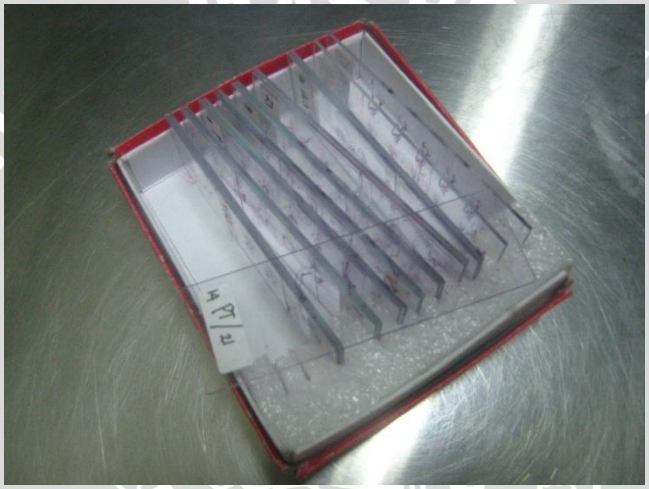
Jangka sorong



Meteran jahit



Papan ukur



Micro glass

Lampiran 3. Hasil data perhitungan umur ikan gulamah (*Johnius belangerii)*

L∞ = 23,2 cm k = 0,81/tahun t_0 = - 0,22

Panjang total : 11 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{11}{23,2} = 1 - Exp^{-0,81(t-(-0.22))}$$

$$0.474 - 1 = -Exp^{-0,81t(-0.1474)}$$

$$-0.525 = -Exp^{-0,81t(-0.1474)}$$

$$-Ln\ (0.525) = -(-0.81t - 0.1474)$$

$$0.6443 = 0.81t + 0.1474)$$

$$0.6443 - 0.1474 = -0.81t$$

$$0.4973/0.81 = t$$

$$0.6\ yrs = t$$

Panjang total : 13,3 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{13,3}{23,2} = 1 - Exp^{-0,81(t-(-0.22))}$$

$$0.573 - 1 = -Exp^{-0,81t(-0.1474)}$$

$$-0.427 = -Exp^{-0,81t(-0.1474)}$$

$$-Ln\ (0.427) = -(-0.81t - 0.1474)$$

$$0.8512 = 0.81t + 0.1474$$

$$0.8512 - 0.1474 = -0.81t$$

$$0.738/0.81 = t$$

$$0.9\ yrs = t$$

Panjang total : 15 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{15}{23,2} = 1 - Exp^{-0,81(t-(-0.22))}$$

$$0.656 - 1 = -Exp^{-0,81t(-0.1474)}$$

$$-0.35 = -Exp^{-0,81t(-0.1474)}$$

$$-Ln\ (0.35) = -(-0.81t - 0.1474)$$

$$1,0498 = 0.81t + 0.1474$$

$$1,0498 - 0.1474 = -0.81t$$

$$0.9024/0.81 = t$$

$$1.01\ yrs = t$$

Panjang total : 17,1 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{17,1}{23,2} = 1 - Exp^{-0,81(t-(-0.22))}$$

$$0.737 - 1 = -Exp^{-0,81t(-0.1474)}$$

$$-0.263 = -Exp^{-0,81t(-0.1474)}$$

$$-Ln\ (0.263) = -(-0.81t - 0.1474)$$

$$1.336 = 0.81t + 0.1474$$

$$1.336 - 0.1474 = -0.81t$$

$$1,2/0.81 = t$$

$$1.5\ yrs = t$$

Lampiran 4. Hasil data perhitungan umur ikan biji nangka (*Upeneus sulphureus*)

L∞ = 31,3 cm k = 0,28/th t_0 = - 0,55 thn

Panjang total : 9 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{9}{31,3} = 1 - Exp^{-0,28(t-(-0.55))}$$

$$0.2875 - 1 = -Exp^{-0,28(t-(-0.55))}$$

$$-0.7125 = -Exp^{-0,28t-0.154}$$

$$-Ln\ (0.7125) = -(-0.28t - 0.154)$$

$$0.33 = 0.28t + 0.154$$

$$0.33 - 0.154 = -0.28t$$

$$0.176/0.28 = t$$

$$0.6\ yrs = t$$

Panjang total : 10,5 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{10,5}{31,3} = 1 - Exp^{-0,28(t-(-0.55))}$$

$$0.335 - 1 = -Exp^{-0,28(t-(-0.55))}$$

$$-0.66 = -Exp^{-0,28t-0.154}$$

$$-Ln\ (0.66) = -(-0.28t - 0.154)$$

$$0.415 = 0.28t + 0.154$$

$$0.415 - 0.154 = -0.28t$$

$$0.261/0.28 = t$$

$$0.9\ yrs = t$$

Panjang total : 11 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{11}{31,3} = 1 - Exp^{-0,28(t-(-0.55))}$$

$$0.351 - 1 = -Exp^{-0,28(t-(-0.55))}$$

$$-0.64 = -Exp^{-0,28t-0.154}$$

$$-Ln\ (0.64) = -(-0.28t - 0.154)$$

$$0.446 = 0.28t + 0.154$$

$$0.446 - 0.154 = -0.28t$$

$$0.29/0.28 = t$$

$$1,04\ yrs = t$$

Panjang total : 13,4 cm

$$\frac{Lt}{L\infty} = 1 - Exp^{-K(t-t0)}$$

$$\frac{13,4}{31,3} = 1 - Exp^{-0,28(t-(-0.55))}$$

$$0.428 - 1 = -Exp^{-0,28(t-(-0.55))}$$

$$-0.572 = -Exp^{-0,28t-0.154}$$

$$-Ln\ (0.572) = -(-0.28t - 0.154)$$

$$0.5586 = 0.28t + 0.154$$

$$0.5586 - 0.154 = -0.28t$$

$$0.41/0.28 = t$$

$$1.5\ yrs = t$$

Lampiran 5. Hasil data perhitungan kemampuan penglihatan ikan gulamah (*Johnius belangerii)* dan biji nangka (*Upeneus sulphureus*).

Gulamah *(Johnius belangerii*)

No.	Panjang total (cm)	Kepadatan sel kon 0.01 mm²	diameter lensa (mm)	jarak fokus lensa (mm)	Sudut pmbda trkcil (menit)	Ketajaman penglihatan	D (m) d= 1mm	D (m) d=5 mm
1	11_1	184	3.60	4.58	13.83	0.072	0.0723	0.3616
2	11_2	191	3.35	4.28	14.55	0.069	0.0687	0.3436
3	11_3	180	3.61	4.60	13.93	0.072	0.0718	0.3589
4	13_1	157	4.14	5.28	12.99	0.077	0.0770	0.3849
5	13_2	149	4.16	5.30	13.29	0.075	0.0752	0.3762
6	13_3	rusak	rusak	rusak	rusak	rusak	rusak	rusak
7	15_1	162	4.17	5.32	12.71	0.079	0.0787	0.3934
8	15_2	129	4.41	5.62	13.46	0.074	0.0743	0.3715
9	15_3	rusak	rusak	rusak	rusak	rusak	rusak	rusak
10	17_1	121	4.99	6.36	12.30	0.081	0.0813	0.4066
11	17_2	132	4.42	5.64	13.27	0.075	0.0754	0.3769
12	17_3	rusak	rusak	rusak	rusak	rusak	rusak	rusak

Biji Nangka *(Upeneus sulphureus)*

No.	Panjang total (cm)	Kepadatan sel kon 0.01 mm²	diameter lensa (mm)	jarak fokus lensa (mm)	Sudut pmbda trkcil (menit)	Ketajaman penglihatan	D (m) d= 1mm	D (m) d= 5mm
1	9_1	106	2.61	3.33	25.06	0.040	0.0399	0.1995
2	9_2	95	2.98	3.80	23.19	0.043	0.0431	0.2156
3	9_3	rusak	rusak	rusak	rusak	rusak	rusak	rusak
4	10.5_1	80	3.17	4.05	23.75	0.042	0.0421	0.2105
5	10.5_2	79	3.42	4.36	22.21	0.045	0.0450	0.2252
6	10.5_3	rusak	rusak	rusak	rusak	rusak	rusak	rusak
7	11_1	75	3.76	4.80	20.70	0.048	0.0483	0.2415
8	11_2	66	4.02	5.12	20.67	0.048	0.0484	0.2419
9	11_3	rusak	rusak	rusak	rusak	rusak	rusak	rusak
10	13_1	54	4.93	6.29	18.60	0.054	0.0538	0.2688
11	13_2	39	5.07	6.47	21.28	0.047	0.0470	0.2349
12	13_3	60	4.12	5.25	21.14	0.047	0.0473	0.2365

Lampiran 6. Hasil uji Anova single factor ikan gulamah (*Johnius belangerii)*

1. Perbandingan kepadatan sel kon ikan gulamah

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	3	555	185	31
Umur 0,9 tahun	2	306	153	32
Umur 1 tahun	2	291	145.5	544.5
Umur 1,5 tahun	2	253	126.5	60.5

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4501.888889	3	1500.62963	10.73411752	0.012825062	5.409451318
Within Groups	699	5	139.8			
Total	5200.888889	8				

2. Perbandingan diameter lensa ikan gulamah

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	3	10.56	3.52	0.0217
Umur 0,9 tahun	2	8.3	4.15	0.0002
Umur 1 tahun	2	8.58	4.29	0.0288
Umur 1,5 tahun	2	9.41	4.705	0.16245

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.818172222	3	0.606057407	12.90307446	0.008639224	5.409451318
Within Groups	0.23485	5	0.04697			
Total	2.053022222	8				

3. Perbandingan sudut pandang minimum antara ikan gulamah

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	3	42.31178388	14.10392796	0.153667711
Umur 0,9 tahun	2	26.28152951	13.14076475	0.045978221
Umur 1 tahun	2	26.16884168	13.08442084	0.282011236
Umur 1,5 tahun	2	25.56602544	12.78301272	0.469938696

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.573267036	3	0.857755679	3.880321842	0.089268	5.409451
Within Groups	1.105263576	5	0.221052715			
Total	3.678530612	8				

4. Perbandingan ketajaman penglihatan ikan gulamah

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	3	0.212822	0.070940667	3.73926E-06
Umur 0,9 tahun	2	0.152222	0.076111	1.51728E-06
Umur 1 tahun	2	0.152968	0.076484	9.62727E-06
Umur 1,5 tahun	2	0.1566579	0.07832895	1.76543E-05

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	7.84594E-05	3	2.61531E-05	3.604610096	0.100665	5.409451
Within Groups	3.62774E-05	5	7.25547E-06			
Total	0.000114737	8				

5. Perbandingan jarak pandang maksimum ikan gulamah

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	3	1.064073541	0.35469118	9.43828E-05
Umur 0,9 tahun	2	0.761092043	0.380546022	3.8559E-05
Umur 1 tahun	2	0.764897669	0.382448834	0.000240937
Umur 1,5 tahun	2	0.783414713	0.391707356	0.000441264

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.001968	3	0.000655949	3.605992568	0.100603	5.409451318
Within Groups	0.00091	5	0.000181905			
Total	0.002877	8				

Lampiran 7. Hasil uji Anova single factor ikan biji nangka (*Upeneus sulphureus*).

1. Perbandingan kepadatan sel kon ikan biji nangka

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	2	201	100.5	60.5
Umur 0,9 tahun	2	159	79.5	0.5
Umur 1 tahun	2	141	70.5	40.5
Umur 1,5 tahun	3	153	51	117

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	3060.5	3	1020.166667	15.20368	0.006025	5.409451318
Within Groups	335.5	5	67.1			
Total	3396	8				

2. Perbandingan diameter lensa ikan biji nangka

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	2	5.59	2.795	0.06845
Umur 0,9 tahun	2	6.59	3.295	0.03125
Umur 1 tahun	2	7.78	3.89	0.0338
Umur 1,5 tahun	3	14.12	4.706666667	0.263033333

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.010833333	3	1.670277778	12.66193292	0.009001	5.409451
Within Groups	0.659566667	5	0.131913333			
Total	5.6704	8				

3. Perbandingan sudut pandang minimum ikan biji nangka

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	2	48.25337451	24.12668725	1.747714228
Umur 0,9 tahun	2	45.95605878	22.97802939	1.192846002
Umur 1 tahun	2	41.37388039	20.6869402	0.000604351
Umur 1,5 tahun	3	61.02249144	20.34083048	2.278549466

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	22.44948741	3	7.483162471	4.989930307	0.0578776	5.409451318
Within Groups	7.498263514	5	1.499652703			
Total	29.94775093	8				

4. Perbandingan ketajaman penglihatan ikan biji nangka

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	2	0.08302	0.04151	5.1842E-06
Umur 0,9 tahun	2	0.08712976	0.04356488	4.2625E-06
Umur 1 tahun	2	0.096688	0.048344	2.45E-09
Umur 1,5 tahun	3	0.1480556	0.049351867	1.4598E-05

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	9.67848E-05	3	3.22616E-05	4.174082648	0.079009	5.409451
Within Groups	3.86452E-05	5	7.72903E-06			
Total	0.00013543	8				

5. Perbandingan jarak pandang maksimum ikan biji nangka

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Umur 0,6 tahun	2	0.415101945	0.207550972	0.000129338
Umur 0,9 tahun	2	0.43569049	0.217845245	0.000107215
Umur 1 tahun	2	0.483397108	0.241698554	8.24983E-08
Umur 1,5 tahun	3	0.74027137	0.246757123	0.000365734

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.002417299	3	0.000805766	4.161569828	0.079412	5.409451
Within Groups	0.000968104	5	0.000193621			
Total	0.003385402	8				

Lampiran 8. Hasil uji BNt kemampuan penglihatan ikan gulamah (*Johnius belangerii)*

1. Uji BNt kepadatan sel kon ikan gulamah

1. Mse =	139.8
2.t(a,df) =	2.570581835
a=	*0.05*
dfe=	5
r =	3
nilai BNT	24.81643484

$$BNt_{\alpha} = (t_{\alpha,df_e}).\sqrt{\frac{2\,(MS_E)}{r}}$$

Umur (thn)	Rata-rata Kepadatan sel kon 0.01 mm² (n) Gulamah (Johnius belangerii)
t_1 (0,6)	185
t_2 (0,9)	153
t_3 (1)	145.5
t_4 (1,5)	126.5

Umur (thn)	Rata-rata Kepadatan sel kon 0.01 mm² (n)	Rata-rata+BNt	Notasi
t_4 (1,5)	88.750	113.566	a
t_3 (1)	108.000	132.816	a
t_2 (0,9)	116.250	141.066	a
t_1 (0,6)	142.750	167.566	b

Umur (thn)	Rata-rata Kepadatan sel kon 0.01 mm² (n)	Notasi
t_4 (1,5)	88.750	a
t_3 (1)	108.000	a
t_2 (0,9)	116.250	a
t_1 (0,6)	142.750	b

2. Uji BNt Diameter lensa ikan gulamah

1. Mse =	0.04697
2.t(a,df) =	2.570581835
a=	*0.05*
dfe=	5
r =	3
nilai BNT	0.454879207

$$BNt_{\alpha} = (t_{\alpha,df_e}).\sqrt{\frac{2\,(MS_E)}{r}}$$

Umur (thn)	Rata-rata Diameter Lensa (mm) Gulamah (Johnius belangerii)
t_1 (0,6)	3.52
t_2 (0,9)	4.15
t_3 (1)	4.29
t_4 (1,5)	4.705

Umur	rata-rata	rata-rata+BNt	Notasi
t_1 (0,6)	3.52	3.974879207	a
t_2 (0,9)	4.15	4.604879207	b
t_3 (1)	4.29	4.744879207	b
t_4 (1,5)	4.705		b

Umur	rata-rata diameter lensa (F)	Notasi
0,6	3.52	a
0,9	4.15	b
1	4.29	b
1,5	4.705	b

Lampiran 9. Hasil uji BNt kemampuan penglihatan ikan biji nangka (*Upeneus sulphureus*).

1. Uji BNt kepadatan sel kon ikan biji nangka

1. Mse =	67.1
2.t(a,df) =	2.570581835
a=	*0.05*
dfe=	5
r =	3
nilai BNT	17.19281796

$$BNt_{\alpha} = (t_{\alpha,df_e}).\sqrt{\frac{2\ (MS_E)}{r}}$$

Umur (thn)	Kepadatan sel kon 0.01 mm² (n)
	Biji Nangka *(Upeneus sulphureus)*
t_1 (0,6)	100.5
t_2 (0,9)	79.5
t_3 (1)	70.5
t_4 (1,5)	51

Umur (thn)	Rata-rata	rata-rata+BNt	Notasi
t_4 (1,5)	51	68.19281796	a
t_3 (1)	70.5	87.69281796	b
t_2 (0,9)	79.5	96.69281796	b
t_1 (0,6)	100.5	117.692818	c

Umur (thn)	Rata-rata kepadatan sel kon	Notasi
1,5	51	a
1	70.5	b
0,9	79.5	b
0,6	100.5	c

2. Uji BNt diameter lensa ikan biji nangka

1. Mse =	0.131913333
2.t(a,df) =	2.570581835
a=	*0.05*
dfe=	5
r =	3
nilai BNT	0.762307429

$$BNt_{\alpha} = (t_{\alpha,df_e}).\sqrt{\frac{2\ (MS_E)}{r}}$$

Umur (thn)	Diameter Lensa (F)
	Biji Nangka (Upeneus sulphureus)
t_1 (0,6)	2.80

t_2 (0,9)	3.30
t_3 (1)	3.89
t_4 (1,5)	4.71

Umur (thn)	Rata-rata	rata-rata+BNt	Notasi
t_1 (0,6)	2.80	3.56	a
t_2 (0,9)	3.30	4.06	ab
t_3 (1)	3.89	4.65	b
t_4 (1,5)	4.71	5.47	c

Umur (thn)	Rata-rata diameter lensa	Notasi
0,6	2.80	a
0,9	3.30	ab
1	3.89	b
1,5	4.71	c

Lampiran 10. Uji T Kemampuan Penglihatan Ikan Gulamah dan Ikan Biji Nangka

1. Uji T Ketajaman penglihatan ikan gulamah (*Johnius belangerii)* dan ikan biji nangka (*Upeneus sulphureus*).

Umur (thn)	Ulangan	Ketajaman Penglihatan	
		Gulamah *(Johnius belangerii*)	Biji Nangka *(Upeneus sulphureus)*
t_1 (0,6)	1	0.072	0.040
	2	0.069	0.043
	3	0.072	
t_2 (0,9)	1	0.077	0.042
	2	0.075	0.045
	3		
t_3 (1)	1	0.079	0.048
	2	0.074	0.048
	3		
t_4 (1,5)	1	0.081	0.054
	2	0.075	0.047
	3		0.047
Varian		0.0000143420969469444	0.0000169287500148445
F-hitung		1.180353896	
F-Tabel (a, df1, df2)		3.438101233	
Keterangan		Equel variance	

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	*Variable 2*
Mean	0.074963322	0.046099262
Variance	1.43421E-05	1.69288E-05
Observations	9	9
Pooled Variance	1.56354E-05	
Hypothesized Mean Difference	0	
df	16	
t Stat	15.48491591	
P(T<=t) one-tail	2.36859E-11	
t Critical one-tail	1.745883669	
P(T<=t) two-tail	0.000000000047371798	
t Critical two-tail	2.119905285	

2. Uji T jarak pandang maksimum ikan gulamah (*Johnius belangerii)* dan ikan biji nangka (*Upeneus sulphureus*).

Umur (thn)	Ulangan	Jarak Pandang Maksimum (m) d=5mm	
		Gulamah *(Johnius belangerii)*	Biji Nangka *(Upeneus sulphureus)*
t_1 (0,6)	1	0.3616	0.1995
	2	0.3436	0.2156
	3	0.3589	
t_2 (0,9)	1	0.3849	0.2105
	2	0.3762	0.2252
	3		
t_3 (1)	1	0.3934	0.2415
	2	0.3715	0.2419
	3		
t_4 (1,5)	1	0.4066	0.2688
	2	0.3769	0.2349
	3		0.2365
Varian		0.0003596713994331080	0.0004231752901306330
F-hitung		1.176560857	
F-Tabel (a, df1, df2)		3.438101233	
Keterangan		Equal variance	

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	*Variable 2*
Mean	0.374830885	0.230495657
Variance	0.000359671	0.000423175
Observations	9	9
Pooled Variance	0.000391423	
Hypothesized Mean Difference	0	
df	16	
t Stat	15.47587588	
P(T<=t) one-tail	2.3895E-11	
t Critical one-tail	1.745883669	
P(T<=t) two-tail	0.000000000047790077355 74	
t Critical two-tail	2.119905285	

3. Uji T sudut pandang minimum ikan gulamah (*Johnius belangerii)* dan ikan biji nangka (*Upeneus sulphureus*).

Umur (thn)	Ulangan	Sudut Pandang Minimum (menit) Gulamah *(Johnius belangerii*)	Sudut Pandang Minimum (menit) Ikan Biji Nangka *(Upeneus sulphureus)*
t_1 (0,6)	1	13.83	25.06
	2	14.55	23.19
	3	13.93	
t_2 (0,9)	1	12.99	23.75
	2	13.29	22.21
	3		
t_3 (1)	1	12.71	20.70
	2	13.46	20.67
	3		
t_4 (1,5)	1	12.30	18.60
	2	13.27	21.28
	3		21.14
Varian		0.4598163264576270000	3.7434688658411200000
F-hitung		8.141226508	
F-Tabel (a, df1, df2)		3.438101233	
keterangan		Unequal Variance	

t-Test: Two-Sample Assuming Unequal Variances

	Variable 1	*Variable 2*
Mean	13.36979783	21.84508946
Variance	0.459816326	3.743468866
Observations	9	9
Hypothesized Mean Difference	0	
df	10	
t Stat	-12.40170728	
P(T<=t) one-tail	1.07108E-07	
t Critical one-tail	1.812461102	
P(T<=t) two-tail	0.000000214215760861746	
t Critical two-tail	2.228138842	

Lampiran 11. Perhitungan Kemampuan Penglihatan Ikan Sampel

Diketahui panjang total ikan gulamah yaitu 11 cm, memiliki umur 0,6 tahun, kepadatan sel kon 184/0,01mm2, diameter lensa 3,35 mm, dan diameter objeknya yaitu 5 mm. Berikut merupakan contoh perhitungan kemampuan penglihatan pada ikan sampel tersebut :

- Jarak Fokus Lensa

$$F = 2{,}55 \times r$$
$$F = 2{,}55 \times \frac{Diameter\ Lensa}{2}$$
$$F = 2{,}55 \times \frac{3{,}35}{2}$$
$$F = 4{,}28$$

- Sudut Pandang Minimum

$$\alpha = \frac{1}{F} \times \left(\frac{0{,}1 \times (1 + 0{,}25) \times 2}{\sqrt{n}}\right) \times \left(\frac{180}{\pi} \times 60\right)$$
$$\alpha = \frac{1}{4{,}28} \times \left(\frac{0{,}1 \times (1 + 0{,}25) \times 2}{\sqrt{184}}\right) \times \left(\frac{180}{3{,}14} \times 60\right)$$
$$\alpha = 14{,}8\ menit$$

- Ketajaman Penglihatan

$$VA = \left(\frac{\alpha \times 180 \times 60}{\pi}\right)^{-1}$$
$$VA = \left(\frac{14{,}8 \times 180 \times 60}{3{,}14}\right)^{-1}$$
$$VA = 0{,}069$$

- Jarak Pandang Maksimum

$$D = \frac{t}{\alpha}$$
$$D = \frac{5}{14{,}8}$$
$$D = 0{,}337\ Meter$$