APPENDICES

APPENDIX A

Questionnaires for tourist

แบบสอบถาม นักท่องเที่ยว ณ ดอนหอยหลอด จ. สมุทรสงคราม

แบบสอบถามนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ระดับปริญญาโท หัวข้อ “การจำลองแบบชนิดหลายตัวแทน เพื่อการอนุรักษ์หอยหลอด *Solen regularis* Dunker, 1862 บริเวณดอนหอยหลอด จังหวัดสมุทรสงคราม” โดยนายกอบชัย วรพิมพงษ์ ภาควิชาชีววิทยา, คณะวิทยาศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย **ทุกข้อมูลในแบบสอบถามนี้จะถูกปกปิดเป็นความลับเพื่อการทำวิทยานิพนธ์นี้เท่านั้น** ขอขอบพระคุณสำหรับการสละเวลาเพื่อตอบแบบสอบถามฉบับนี้

นายกอบชัย วรพิมพงษ์

****

วันที่สัมภาษณ์_____

เวลา_____

ผู้สัมภาษณ์_____

ชุดที่.....

ข้อมูลทั่วไป

1. ชื่อ_____ นามสกุล_____

2. เพศ ❍ ชาย ❍ หญิง

อายุ

❍ น้อยกว่า 20 ปี ❍ 20-30 ปี

❍ 31-40 ปี ❍ 41-50 ปี ❍ มากกว่า 50 ปี

3. ที่อยู่ปัจจุบัน_____

_____

ระยะทางจากบ้านกับดอนหอยหลอด_____กิโลเมตร

4. อาชีพ

❍ นักเรียน, นักศึกษา

❍ ค้าขาย

❍ รับราชการ

❍ พนักงานรัฐวิสาหกิจ

❍ พนักงานบริษัท, ธนาคาร

❍ รับจ้างทั่วไป

❍ ประมง

5. รายได้เฉลี่ยต่อเดือน

❍ น้อยกว่า 2,000 บาท ❍ 2001-4000 บาท

❍ 4,001-6,000 บาท ❍ 6,001-8,000 บาท

❍ 8,001-10,000 บาท ❍ 10,001-12,000 บาท

❍ 12,001-14,000 บาท ❍ มากกว่า14,000 บาท

6. จำนวนสมาชิกในครอบครัวท่าน

❍ น้อยกว่า 3 คน ❍ 3-5 คน

❍ 5-7 คน ❍ มากกว่า 7 คน

จำนวนสมาชิกที่ประกอบอาชีพ และมีรายได้ _____ คน

<u>การท่องเที่ยว</u>

8. ท่านเคยมาดอนหอยหลอดมาก่อนหรือไม่

❍ ไม่เคย ❍ เคย _____ ครั้ง

9 ท่านมีวัตถุประสงใดในการมาดอนหอยหลอด

☐ ชมพื้นที่โดยรอบดอนหอยหลอด

☐ รับประทานอาหารริมทะเล

☐ กราบกรมหลวงชุมพรเขตอุดมศักดิ์

☐ ซื้อผลิตภัณฑ์จากหอยหลอดและอาหารทะเลอื่นๆ

☐ ลงท่องเที่ยวบริเวณหาดเลน ดอนหอยหลอด

❍ ไม่ได้ซื้อปูนขาวลงไปทดลองจับหอย

❍ ซื้อปูนขาวลงไปทดลองจับหอย

❍ จับหอยได้_____ ตัว

❍ จับไม่ได้

❍ท่านไม่ได้นำปูนขาวที่เหลือกลับมาบนฝั่งด้วย

❍ ท่านนำปูนขาวที่เหลือกลับมาบนฝั่งด้วย

ขอขอบพระคุณอย่างสูงที่สละเวลาให้ความร่วมมือ

กอบชัย วรพิมพงษ์

APPENDIX B

B1 Independent sample t-test for razor clam density month by month

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	March04	81	7.41	6.190	.688
	April04	81	8.12	6.319	.702

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	.369	.544	-.729	160	.467	-.72	.983	-2.657	1.225
	Equal variances not assumed			-.729	159.932	.467	-.72	.983	-2.657	1.225

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	April04	81	8.12	6.319	.702
	May04	81	8.72	7.578	.842

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	2.147	.145	-.541	160	.590	-.59	1.096	-2.758	1.573
	Equal variances not assumed			-.541	154.995	.590	-.59	1.096	-2.758	1.573

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	May04	81	8.72	7.578	.842
	June04	81	7.88	6.763	.751

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	.843	.360	.744	160	.458	.84	1.129	-1.389	3.068
	Equal variances not assumed			.744	157.970	.458	.84	1.129	-1.390	3.069

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	June04	81	7.88	6.763	.751
	July04	81	6.72	5.290	.588

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	4.103	.044	1.216	160	.226	1.16	.954	-.724	3.044
	Equal variances not assumed			1.216	151.228	.226	1.16	.954	-.724	3.045

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	July04	81	6.72	5.290	.588
	August04	81	7.11	4.785	.532

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	.022	.882	-.498	160	.619	-.40	.793	-1.960	1.170
	Equal variances not assumed			-.498	158.420	.619	-.40	.793	-1.960	1.170

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	August04	81	7.11	4.785	.532
	September04	81	4.02	3.070	.341

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	18.344	.000	4.886	160	.000	3.09	.632	1.839	4.334
	Equal variances not assumed			4.886	136.310	.000	3.09	.632	1.837	4.336

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	September04	81	4.02	3.070	.341
	October04	81	4.28	2.721	.302

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	.030	.862	-.569	160	.570	-.26	.456	-1.159	.641
	Equal variances not assumed			-.569	157.731	.570	-.26	.456	-1.160	.641

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	October04	81	4.28	2.721	.302
	November04	81	4.15	3.340	.371

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	1.243	.267	.284	160	.777	.14	.479	-.810	1.081
	Equal variances not assumed			.284	153.734	.777	.14	.479	-.810	1.081

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	November04	81	4.15	3.340	.371
	December04	81	4.81	5.070	.563

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	1.334	.250	-.988	160	.324	-.67	.675	-1.999	.665
	Equal variances not assumed			-.988	138.426	.325	-.67	.675	-2.000	.667

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	December04	81	4.81	5.070	.563
	Januaryo5	81	2.74	2.090	.232

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	8.576	.004	3.404	160	.001	2.07	.609	.871	3.277
	Equal variances not assumed			3.404	106.436	.001	2.07	.609	.866	3.282

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
DENSITY	Januaryo5	81	2.74	2.090	.232
	February05	81	2.57	2.307	.256

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
DENSITY	Equal variances assumed	.011	.917	.500	160	.618	.17	.346	-.510	.856
	Equal variances not assumed			.500	158.465	.618	.17	.346	-.510	.856

B2 Independent sample t-test for razor clam weight and length month by month

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
WEIGHT	March04	600	1.6084	1.35464	.05530
	April04	658	1.9345	1.32083	.05149
LENGTH	March04	600	3.712	.9976	.0407
	April04	658	3.933	.8391	.0327

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
WEIGHT	Equal variances assumed	.030	.862	-4.321	1256	.000	-.3261	.07548	-.47418	-.17804
	Equal variances not assumed			-4.316	1238.867	.000	-.3261	.07556	-.47436	-.17787
LENGTH	Equal variances assumed	16.143	.000	-4.259	1256	.000	-.221	.0518	-.3224	-.1190
	Equal variances not assumed			-4.225	1175.203	.000	-.221	.0522	-.3232	-.1182

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	April04	658	3.933	.8391	.0327
	May05	706	3.900	.7148	.0269
WEIGHT	April04	658	1.935	1.3208	.0515
	May05	706	1.736	1.0064	.0379

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	10.487	.001	.783	1362	.434	.033	.0421	-.0497	.1156
	Equal variances not assumed			.778	1294.472	.437	.033	.0424	-.0501	.1160
WEIGHT	Equal variances assumed	23.588	.000	3.138	1362	.002	.199	.0633	.0745	.3229
	Equal variances not assumed			3.108	1225.898	.002	.199	.0639	.0733	.3241

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	May04	706	3.900	.7148	.0269
	June04	638	4.064	.6897	.0273
WEIGHT	May04	706	1.7358	1.00644	.03788
	June04	638	2.0066	1.06166	.04203

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	1.303	.254	-4.277	1342	.000	-.164	.0384	-.2396	-.0889
	Equal variances not assumed			-4.284	1336.259	.000	-.164	.0383	-.2394	-.0890
WEIGHT	Equal variances assumed	4.409	.036	-4.798	1342	.000	-.2707	.05643	-.38144	-.16005
	Equal variances not assumed			-4.785	1310.694	.000	-.2707	.05658	-.38175	-.15975

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	June04	638	4.064	.6897	.0273
	July04	539	4.218	.7657	.0330
WEIGHT	June04	638	2.0066	1.06166	.04203
	July04	539	2.3370	1.17909	.05079

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	3.255	.071	-3.625	1175	.000	-.154	.0424	-.2371	-.0706
	Equal variances not assumed			-3.593	1094.101	.000	-.154	.0428	-.2379	-.0698
WEIGHT	Equal variances assumed	5.779	.016	-5.057	1175	.000	-.3304	.06535	-.45866	-.20224
	Equal variances not assumed			-5.013	1093.936	.000	-.3304	.06592	-.45980	-.20110

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	July04	539	4.218	.7657	.0330
	August04	576	4.198	1.0916	.0455
WEIGHT	July04	539	2.3370	1.17909	.05079
	August04	576	2.4973	1.43623	.05984

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	43.702	.000	.347	1113	.729	.020	.0568	-.0918	.1312
	Equal variances not assumed			.351	1033.332	.726	.020	.0562	-.0905	.1300
WEIGHT	Equal variances assumed	24.060	.000	-2.029	1113	.043	-.1603	.07900	-.31531	-.00531
	Equal variances not assumed			-2.042	1094.655	.041	-.1603	.07849	-.31432	-.00631

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	August04	576	4.198	1.0916	.0455
	September04	326	4.150	1.0878	.0602
WEIGHT	August04	576	2.4973	1.43623	.05984
	September04	326	2.4173	1.54591	.08562

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	6.198	.013	.640	900	.522	.048	.0756	-.0999	.1967
	Equal variances not assumed			.641	676.773	.522	.048	.0755	-.0998	.1966
WEIGHT	Equal variances assumed	5.612	.018	.782	900	.434	.0801	.10235	-.12080	.28095
	Equal variances not assumed			.767	634.505	.444	.0801	.10446	-.12506	.28520

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	September04	326	4.150	1.0878	.0602
	October04	347	4.221	.9840	.0528
WEIGHT	September04	326	2.4173	1.54591	.08562
	October04	347	2.4090	1.60595	.08621

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	3.708	.055	-.890	671	.374	-.071	.0799	-.2279	.0858
	Equal variances not assumed			-.887	653.819	.376	-.071	.0801	-.2284	.0863
WEIGHT	Equal variances assumed	.336	.562	.068	671	.946	.0083	.12165	-.23058	.24714
	Equal variances not assumed			.068	670.600	.946	.0083	.12150	-.23030	.24685

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	October04	347	4.221	.9840	.0528
	November04	336	4.216	.8566	.0467
WEIGHT	October04	347	2.4090	1.60595	.08621
	November04	336	2.3220	1.42219	.07759

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	21.093	.000	.064	681	.949	.005	.0707	-.1342	.1433
	Equal variances not assumed			.065	673.452	.948	.005	.0705	-.1339	.1430
WEIGHT	Equal variances assumed	10.651	.001	.748	681	.454	.0870	.11621	-.14121	.31514
	Equal variances not assumed			.750	675.662	.454	.0870	.11598	-.14076	.31470

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	November04	336	4.216	.8566	.0467
	December04	390	4.344	.8727	.0442
WEIGHT	November04	336	2.3220	1.42219	.07759
	December04	390	2.3963	1.30301	.06598

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	.003	.957	-1.978	724	.048	-.127	.0644	-.2538	-.0010
	Equal variances not assumed			-1.981	711.837	.048	-.127	.0643	-.2537	-.0011
WEIGHT	Equal variances assumed	1.147	.285	-.734	724	.463	-.0743	.10119	-.27292	.12440
	Equal variances not assumed			-.729	685.842	.466	-.0743	.10185	-.27423	.12571

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	December04	390	4.344	.8727	.0442
	January05	227	4.382	.9598	.0637
WEIGHT	December04	390	2.3963	1.30301	.06598
	January05	227	2.4004	1.42131	.09434

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	2.288	.131	-.513	615	.608	-.039	.0756	-.1873	.1097
	Equal variances not assumed			-.500	437.038	.617	-.039	.0775	-.1912	.1136
WEIGHT	Equal variances assumed	.919	.338	-.037	615	.971	-.0041	.11251	-.22506	.21683
	Equal variances not assumed			-.036	440.020	.972	-.0041	.11512	-.23037	.22214

Group Statistics

	MONTH	N	Mean	Std. Deviation	Std. Error Mean
LENGTH	January05	227	4.382	.9598	.0637
	February05	208	4.415	1.0340	.0717
WEIGHT	January05	227	2.4004	1.42131	.09434
	February05	208	2.6527	1.57186	.10899

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
LENGTH	Equal variances assumed	1.515	.219	-.345	433	.730	-.033	.0956	-.2209	.1549
	Equal variances not assumed			-.344	421.972	.731	-.033	.0959	-.2215	.1555
WEIGHT	Equal variances assumed	4.603	.032	-1.758	433	.079	-.2523	.14351	-.53437	.02977
	Equal variances not assumed			-1.750	418.302	.081	-.2523	.14415	-.53564	.03104

B1 Questionnaire SPSS analysis

SEX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	67	45.9	45.9	45.9
	Female	79	54.1	54.1	100.0
	Total	146	100.0	100.0	

AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 20	27	18.5	18.6	18.6
	20-30	50	34.2	34.5	53.1
	31-40	38	26.0	26.2	79.3
	41-50	18	12.3	12.4	91.7
	> 50	12	8.2	8.3	100.0
	Total	145	99.3	100.0	
Missing	System	1	.7		
Total		146	100.0		

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	student	34	23.3	23.3	23.3
	merchant	30	20.5	20.5	43.8
	goverment officer	19	13.0	13.0	56.8
	พนักงานรัฐวิสาหกิจ	8	5.5	5.5	62.3
	company or bank officer	17	11.6	11.6	74.0
	employee	37	25.3	25.3	99.3
	fisherman	1	.7	.7	100.0
	Total	146	100.0	100.0	

INCOME

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 2000	21	14.4	14.6	14.6
	2001-4000	20	13.7	13.9	28.5
	4001-6000	20	13.7	13.9	42.4
	6001-8000	23	15.8	16.0	58.3
	8001-10000	24	16.4	16.7	75.0
	10001-14000	17	11.6	11.8	86.8
	> 14000	19	13.0	13.2	100.0
	Total	144	98.6	100.0	
Missing	System	2	1.4		
Total		146	100.0		

Ever been here

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	30	20.5	20.5	20.5
	ever	116	79.5	79.5	100.0
	Total	146	100.0	100.0	

Look around area

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	22	15.1	15.1	15.1
	Yes	124	84.9	84.9	100.0
	Total	146	100.0	100.0	

Have a meal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	52	35.6	35.6	35.6
	Yes	94	64.4	64.4	100.0
	Total	146	100.0	100.0	

Pay obeisance to Khommaluang

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	57	39.0	39.0	39.0
	Yes	89	61.0	61.0	100.0
	Total	146	100.0	100.0	

Buy product from seafood

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	86	58.9	58.9	58.9
	Yes	60	41.1	41.1	100.0
	Total	146	100.0	100.0	

Travelling sand on dune

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	17.8	17.8	17.8
	Yes	120	82.2	82.2	100.0
	Total	146	100.0	100.0	

Catch a Razor Clam

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	17.8	17.8	17.8
	Yes	120	82.2	82.2	100.0
	Total	146	100.0	100.0	

Can you catch razor clam

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	98	67.1	81.7	81.7
	yes	22	15.1	18.3	100.0
	Total	120	82.2	100.0	
Missing	System	26	17.8		
Total		146	100.0		

How many a Razor Clam did you catch?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	98	67.1	83.8	83.8
	1	3	2.1	2.6	86.3
	2	3	2.1	2.6	88.9
	3	2	1.4	1.7	90.6
	4	1	.7	.9	91.5
	5	2	1.4	1.7	93.2
	6	1	.7	.9	94.0
	10	4	2.7	3.4	97.4
	12	1	.7	.9	98.3
	30	1	.7	.9	99.1
	50	1	.7	.9	100.0
	Total	117	80.1	100.0	
Missing	System	29	19.9		
Total		146	100.0		

Leaved Lime on Sand dune

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	101	69.2	84.2	84.2
	Yes	19	13.0	15.8	100.0
	Total	120	82.2	100.0	
Missing	System	26	17.8		
Total		146	100.0		

B2 Length and Weight Relationship (LWR)of Razor clam from SPSS analysis

---

Curve Fit

MODEL: MOD_1.
_

Dependent variable.. WEIGHT Method.. POWER

Listwise Deletion of Missing Data

Multiple R .96701
R Square .93512
Adjusted R Square .93511
Standard Error .17979

Analysis of Variance:

	DF	Sum of Squares	Mean Square
Regression	1	2585.2100	2585.20995
Residuals	5549	179.3724	.03233

F = 79975.13626 Signif F = .0000

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
LENGTH	2.811829	.009943	.967015	282.799	.0000
(Constant)	.035608	.000496		71.745	.0000

B3 Cluster analysis of Density of razor clam from SPSS

Cluster

Case Processing Summary(a,b)

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
27	100.0	0	.0	27	100.0

a Squared Euclidean Distance Undefined error #14704 - Cannot open tex
b Average Linkage (Between Groups)

Average Linkage (Between Groups)

Agglomeration Schedule

	Cluster Combined			Stage Cluster First Appears		
Stage	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
1	6	15	.000	0	0	16
2	3	8	.000	0	0	4
3	17	21	.001	0	0	12
4	3	12	.007	2	0	11
5	16	18	.012	0	0	15
6	7	14	.012	0	0	22
7	5	11	.019	0	0	19
8	4	10	.019	0	0	25
9	20	25	.028	0	0	14
10	24	27	.028	0	0	17
11	3	22	.051	4	0	16
12	17	26	.056	3	0	17
13	2	19	.062	0	0	18
14	1	20	.069	0	9	15
15	1	16	.195	14	5	21
16	3	6	.233	11	1	20
17	17	24	.234	12	10	21
18	2	9	.252	13	0	20
19	5	23	.676	7	0	22
20	2	3	.910	18	16	23
21	1	17	.956	15	17	23
22	5	7	2.872	19	6	24
23	1	2	4.785	21	20	25
24	5	13	8.867	22	0	26
25	1	4	19.220	23	8	26
26	1	5	33.890	25	24	0

Cluster Membership

Case	3 Clusters
1:A1	1
2:A2	1
3:A3	1
4:A4	2
5:B1	3
6:B2	1
7:B3	3
8:B4	1
9:B5	1
10:B6	2
11:C1	3
12:C2	1
13:C3	3
14:C4	3
15:C5	1
16:C6	1
17:C7	1
18:C8	1
19:D1	1
20:D2	1
21:D3	1
22:D4	1
23:D5	3
24:D6	1
25:D7	1
26:D8	1
27:D9	1

APPENDIX C

Important source code of Don Hoi Lord Model

RazorClamPopulation

```
breeding: t
        "each female gives 36 offspring"

        | newClams r |
        r := self breedingProbability: t \\ 365.
        newClams := self femaleNumber * self offSpringsNumber * r
                                * (1 - (self totalNumber / self patch carryingCapacity)).
        newClams < 0 ifTrue: [newClams := 0].
        self offsprings add: newClams.
        self populationStructure at: 3
                put: (self populationStructure at: 3) + self offsprings first.
        self offsprings removeFirst

breedingProbability: t
        t <= 31 ifTrue: [^0.0324].
        t <= 61 ifTrue: [^0.0268].
        t <= 92 ifTrue: [^0.0302].
        t <= 122 ifTrue: [^0.01].
        t <= 153 ifTrue: [^0.004].
        t <= 183 ifTrue: [^0.031].
        t <= 214 ifTrue: [^0.032].
        t <= 244 ifTrue: [^0.0023].
        t <= 275 ifTrue: [^0.014].
        t <= 305 ifTrue: [^0.016].
        t <= 336 ifTrue: [^0.016].
        t <= 365 ifTrue: [^0.018]
```

naturalMortality

"naturalMortallity it's mean Death rate in every size class in every step t"

populationStructure keysAndValuesDo: [:key :value | populationStructure at: key put: (value- (value * self naturalDeathRate))]

updatePopulationGrowth

"updatePopulationGrowth it's mean Pupulation structure will update every step from previous step and add new number to population structure"

```
| newPopulationStructure |
newPopulationStructure := Dictionary new.
newPopulationStructure at: 7
        put: (populationStructure at: 7) + (populationStructure at: 6).
4 to: 6
        do: [:i | newPopulationStructure at: i put: (populationStructure at: i - 1)].
newPopulationStructure at: 3 put: 0.
self populationStructure: newPopulationStructure
```

init

"initiation of razor clam population by put 0 (zero) in every size class"

```
populationStructure := Dictionary new.
populationStructure at: 3 put: (Cormas randomFrom: 15 to: 20).
populationStructure at: 4 put: (Cormas randomFrom: 10 to: 15).
populationStructure at: 5 put: (Cormas randomFrom: 5 to: 10).
populationStructure at: 6 put: (Cormas randomFrom: 3 to: 5).
populationStructure at: 7 put:(Cormas randomFrom: 1 to: 5).
offsprings :=OrderedCollection new.
90 timesRepeat:  [offsprings add: 0]
```

povHarvestableNumber

"HavestableNumber it's mean Number of razor clam are collect from cell. If no razor clam is collected color of this cell is white but if one or more razor clam are collect color of this cell will become blue and more blue following collect number (Maximun number is 30)."

```
^self
        povAttribute: #harvestableNumber
        min: 0
        max: 30
        color: ColorValue blue
"^ColorValue white"
```

Fisherman

stepOneGoodMove

"GoodMove is one walk method of fisherman, this method they try to walk to a cell has a hight abundance of razor clam population "

```
self nCellsHarvested < self totalCellsToHarvest
        ifTrue:
                [nCellsHarvested := nCellsHarvested + 1.

                self walkToMaxOf: #totalClams.
                [self patch totalClams < 1] whileTrue:
                                [self randomWalk.
                                self patch color: #red].
                self harvest]
```

stepOneGoodMoveConstrained

```
"GoodMove is one  walk method of fisherman, this method they try to walk to a cell has a hight abundance of razor clam population "

	| |
	self nCellsHarvested < self totalCellsToHarvest
		ifTrue:
			[
			nCellsHarvested := nCellsHarvested + 1.
			self walkToMaxOf: #totalClams constrainedBy: [:c | c isAllowed ].
			self patch accessAllowed = 0 ifTrue: [self halt].
			self harvest]


harvest
	| rc harvestRate h |
"rc is the RCP located in the patch of the fisherman "
" fisherman can take from thirty to one hundred percent of the clams"
"loop on each size class of the rcp. If size > 3 then h is the harevested qty of clams from this size class. Remove h from the rcp and add it to the box of the fisherman"
	rc := (self patch occupantsAt: #RazorClamPopulation) first.
	harvestRate := (Cormas randomFrom: 100 to: 100) / 100.
	rc populationStructure keysAndValuesDo:
			[:key :value |
			key > 3
				ifTrue:
					[h := (value * harvestRate) rounded.
					rc populationStructure at: key put: value - h.
					self clams at: key put: ((self clams at: key) + h)]].
"self patch defineVisualState; show"
totalWeigthHarvested
```

"tatal weight harvested calculate from all of clam in fisherman box by use a size (length) of each razor clam and take its in following equasion : weight = 0.364* lenght^2.8003 . Finally,combine every razor clams weight together"

```
| x |
x := 0.
self clams
        keysAndValuesDo: [:key :value |  x := x + (value * (0.0364 * (key raisedTo: 2.8003)))].
^x
```

DonHoiLord Initial instanciation

stepGoodMoveOneByOne: t

"Step GoodMove represent growth of razor clam population every 30 days or 1 month and fisherman harvesting behavior in Good Move method"

```
| activeFishermen |
t \\ 30 = 0
        ifTrue:
                [self theRazorClamPopulations do: [:a | a step: (t \\ 30 - 1) \\ 12 + 1]].
self theRazorClamPopulations do: [:a | a stepBreeding: t].
activeFishermen := OrderedCollection new.
t >365
        ifTrue:
                [self theFishermans do:
                        [:a |
                        a release.
```

```
                                        Cormas random < 0.66 ifTrue: [activeFishermen
add: a]].
                        [activeFishermen contains: [:b | b nCellsHarvested < b
totalCellsToHarvest]]
                                whileTrue: [activeFishermen do: [:f | f
stepOneGoodMove. f patch color: #red]]]


stepGoodMoveOneByOneWithReserve: t
        "Step GoodMove represent growth of razor clam population every 30 days or
1 month and fisherman harvesting behavior in Good Move method"

        | activeFishermen |
        t \\ 30 = 0
                ifTrue:
                        [self theRazorClamPopulations do: [:a | a step: (t \\ 30 - 1) \\ 12
+ 1]].
        self theRazorClamPopulations do: [:a | a stepBreeding: t].
        self moveZones: t.
        activeFishermen := OrderedCollection new.
        t > 365
                ifTrue:
                        [self theFishermans do:
                                        [:a |
                                        a release.
                                        Cormas random < 0.66 ifTrue: [activeFishermen
add: a]].
                        [activeFishermen contains: [:b | b nCellsHarvested < b
totalCellsToHarvest]]
                                whileTrue: [activeFishermen do: [:f | f
stepOneGoodMoveConstrained]]]
stepNoFishermen: t
```

```
"Step GoodMove represent growth of razor clam population every 30 days or
1 month and fisherman harvesting behavior in Good Move method"
        t \\ 30 = 0
                ifTrue:
                        [self theRazorClamPopulations do: [:a | a step: (t \\ 30 - 1) \\ 12
+ 1]].
        self theRazorClamPopulations do: [:a | a stepBreeding: t].


createZones
        self
                zone1: (self theCells select:
                                [:a |
                                a numLine < (self spaceModel line  /2 )
                                        and: [a numCol < (self spaceModel
column/2)]]).
        self
                zone2: (self theCells select:
                                [:a |
                                a numLine >= (self spaceModel line/2)
                                        and: [a numCol < (self spaceModel
column/2)]]).
        self
                zone3: (self theCells select:
                                [:a |
                                a numLine < (self spaceModel line/2 )
                                        and: [a numCol >= (self spaceModel
column/2)]]).
        self
                zone4: (self theCells select:
                                [:a |
                                a numLine >= (self spaceModel line/2)
```

```
                                        and: [a numCol >= (self spaceModel
column/2)]])
```

initAgents

"Initiation of model, First initiate razor clam poulation (rp) in each cell and add new rp in each step second initiate located fisherman"

```
    | rp |
    super initAgents.
    self theCells do:
            [:c |
            rp := RazorClamPopulation new.
            rp init.
            rp moveTo: c.
            self theRazorClamPopulations add: rp].
    self setRandomlyLocatedAgents: Fisherman n: self nFishermen
```

initAgentsReserve

"Initiation of model, First initiate razor clam poulation (rp) in each cell and add new rp in each step second initiate located fisherman"

```
    | rp |
    super initAgents.
    self theCells do:
            [:c |
            rp := RazorClamPopulation new.
            rp init.
            rp moveTo: c.
            self theRazorClamPopulations add: rp].
    self setRandomlyLocatedAgents: Fisherman n: self nFishermen.
```

```
initCells
	"Initiation of soil by set area proportion in each value of soil quality. It's represent the quantity of razor clam production and razor clam population"
	| c |
	super initCells.
	c := self spaceModel centralLocation.
	(c recursiveNeighbourhood: (self spaceModel line * 4 / 5) rounded)
		do: [:a | a grainSize: 2].
	(c recursiveNeighbourhood: (self spaceModel line * 1.5/ 5) rounded)
		do: [:a | a grainSize: 3]


initSoilCells
	"Initiation of soil by set area proportion in each value of soil quality. It's represent the quantity of razor clam production and razor clam population"
	| c |
	super initCells.
	c := self spaceModel centralLocation.
	(c recursiveNeighbourhood: (self spaceModel line * 3 / 5) rounded)
		do: [:a | a grainSize: 2].
	(c recursiveNeighbourhood: (self spaceModel line * 1.5 / 5) rounded)
		do: [:a | a grainSize: 3]


moveZones: t
```

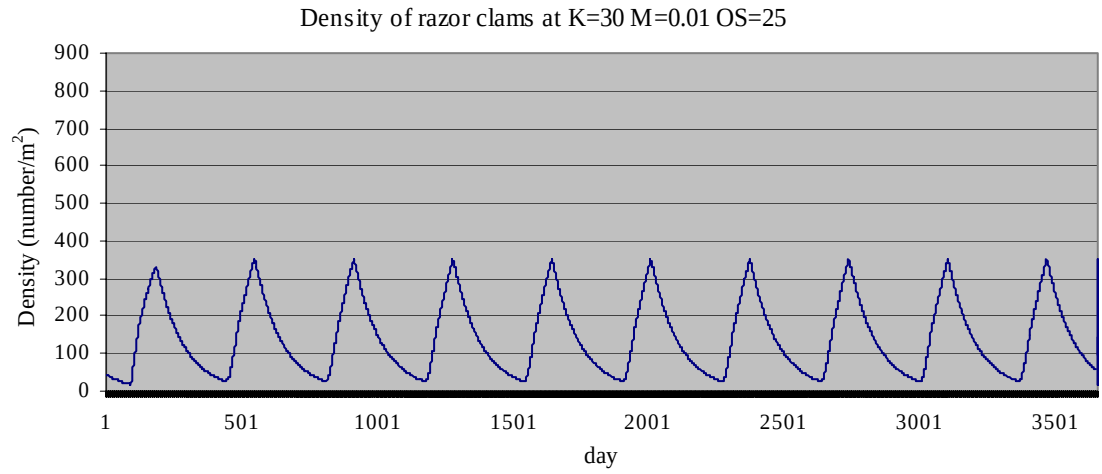
```
| possibleCells cell |
t \\ 365 = 1
        ifTrue:
                [self zone1 do:
                        [:a |
                        a accessAllowed: 0.
                        a
                                defineVisualState;
                                show].
                possibleCells := self theCells reject: [:a | self zone1 includes: a].
                self theFishermans
                        do:
                                [:f |
                                cell := Cormas selectRandomlyFrom:
possibleCells.
                                f moveTo: cell]. self
                                        zone4
                        do:
                                [:a |
                                a accessAllowed: 1.
                                a
                                        defineVisualState;
                                        show]].
t \\ 365 = 91
        ifTrue:
                [self zone1 do:
                        [:a |
                        a accessAllowed: 1.
                        a
                                defineVisualState;
                                show].
                possibleCells := self theCells reject: [:a | self zone2 includes: a].
```

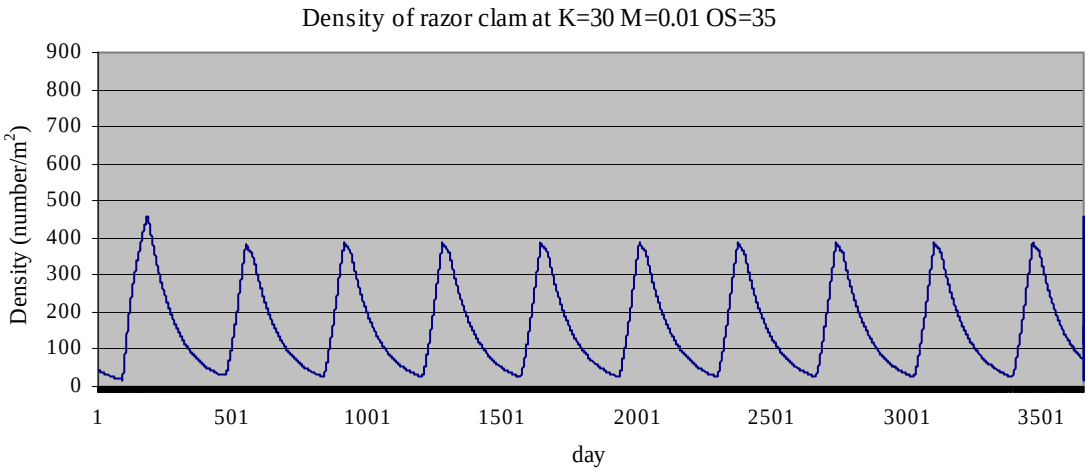
```
                self theFishermans do:
                        [:f |
                        cell := Cormas selectRandomlyFrom:
possibleCells.
                        f moveTo: cell].
                self zone2 do:
                        [:a |
                        a accessAllowed: 0.
                        a
                                defineVisualState;
                                show]].
        t \\ 365 = 182
                ifTrue:
                        [self zone2 do:
                                [:a |
                                a accessAllowed: 1.
                                a
                                        defineVisualState;
                                        show].
                        possibleCells := self theCells reject: [:a | self zone3 includes: a].
                        self theFishermans do:
                                [:f |
                                cell := Cormas selectRandomlyFrom:
possibleCells.
                                f moveTo: cell].
                        self zone3 do:
                                [:a |
                                a accessAllowed: 0.
                                a
                                        defineVisualState;
                                        show]].
        t \\ 365 = 273
```

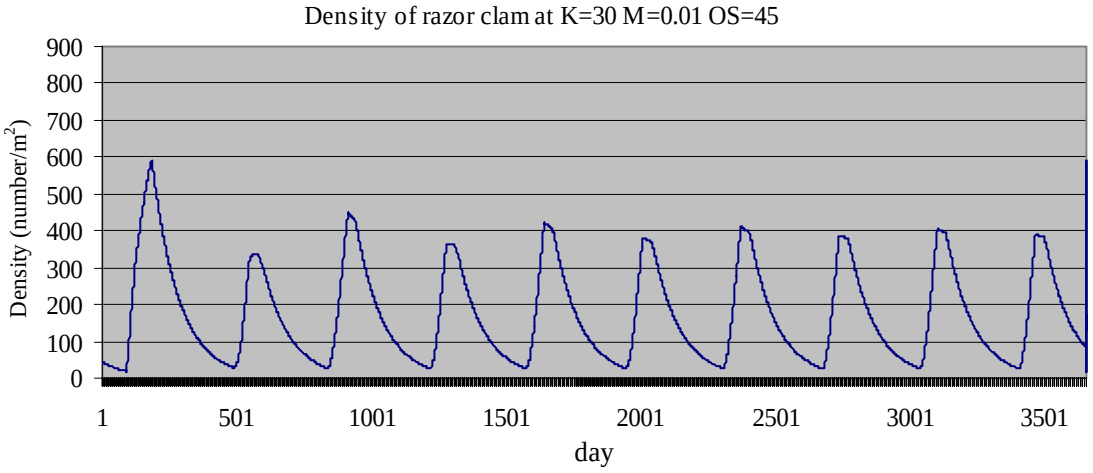
```
                ifTrue:
                        [self zone3 do:
                                [:a |
                                a accessAllowed: 1.
                                a
                                        defineVisualState;
                                        show].
                        possibleCells := self theCells reject: [:a | self zone4 includes: a].
                        self theFishermans do:
                                [:f |
                                cell := Cormas selectRandomlyFrom:
possibleCells.
                                f moveTo: cell].
                        self zone4 do:
                                [:a |
                                a accessAllowed: 0.
                                a
                                        defineVisualState;
                                        show]]
```

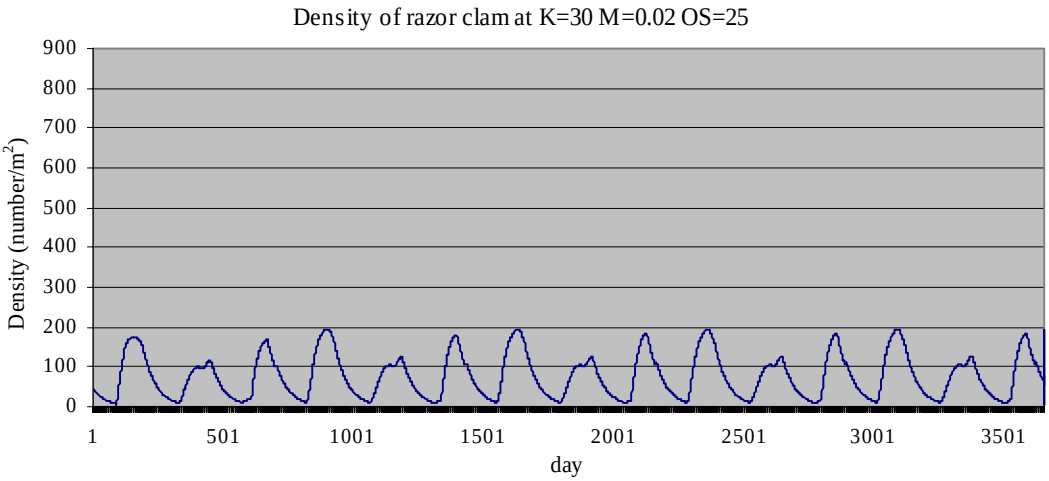
APPENDIX D

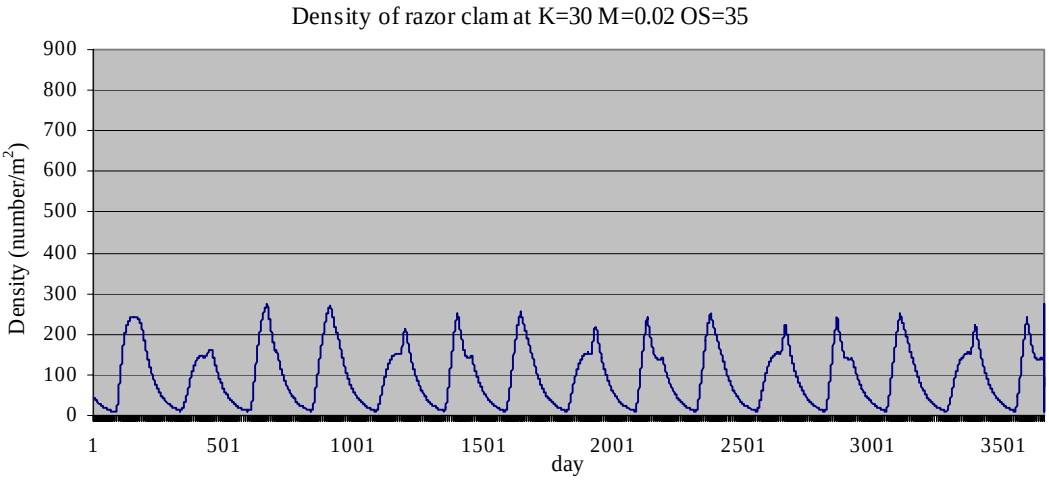
D1 Sensitivity analysis to select parameter

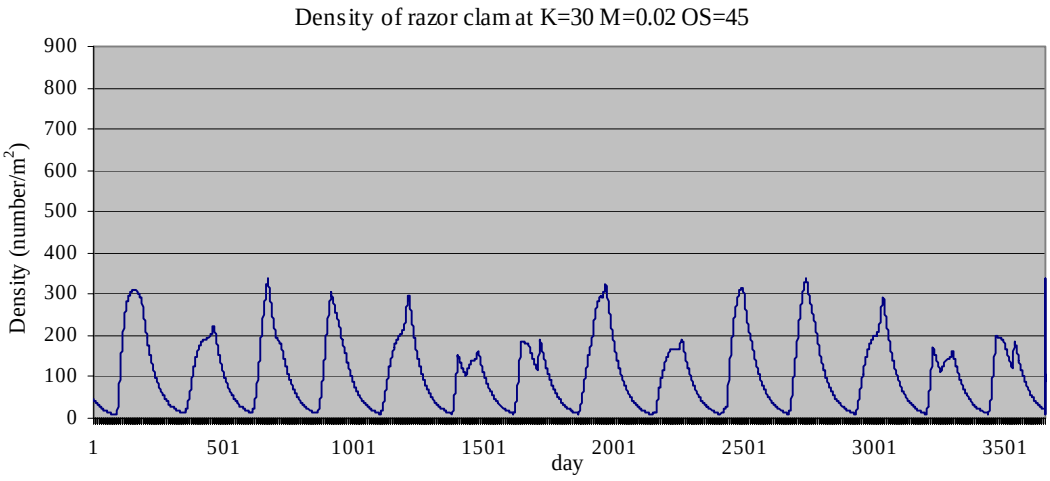


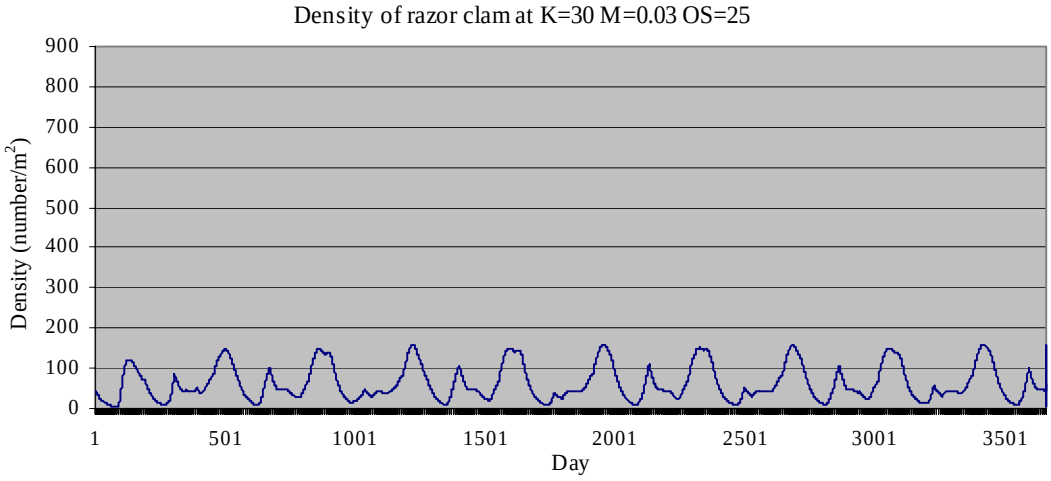


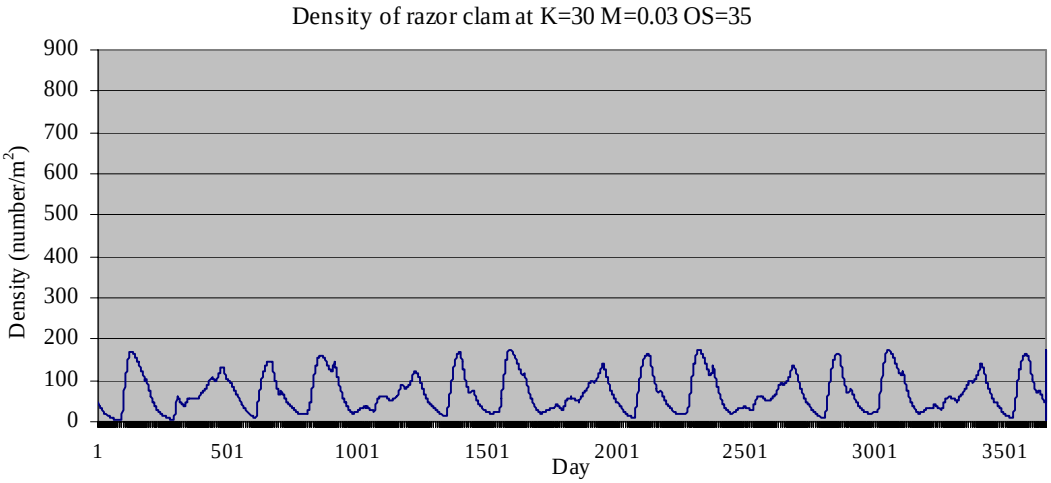


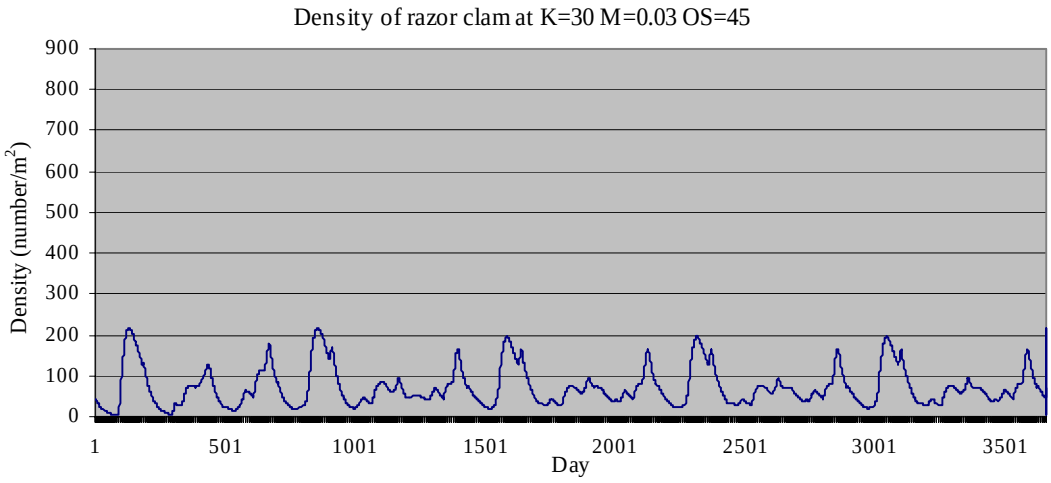

Density of razor clam at K=30 M=0.02 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
day

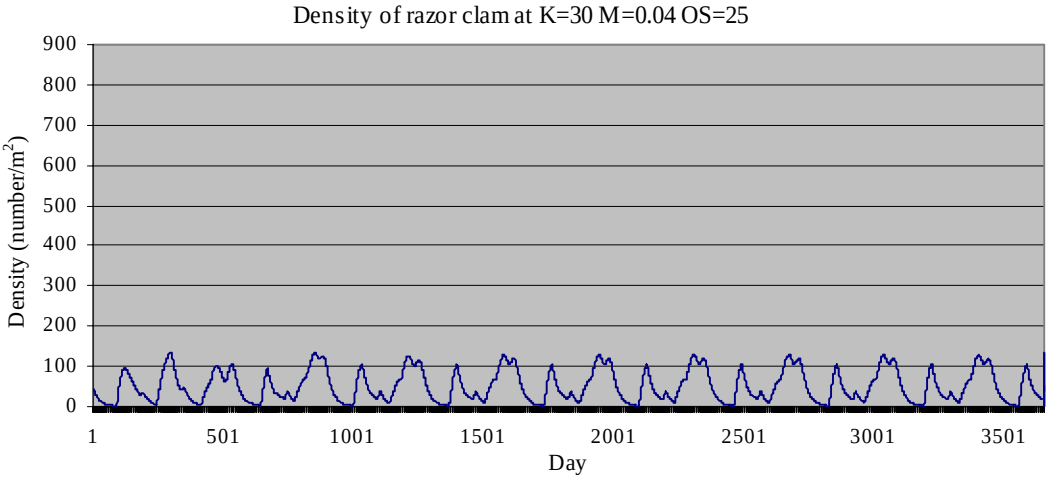

Density of razor clam at K=30 M=0.02 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
day

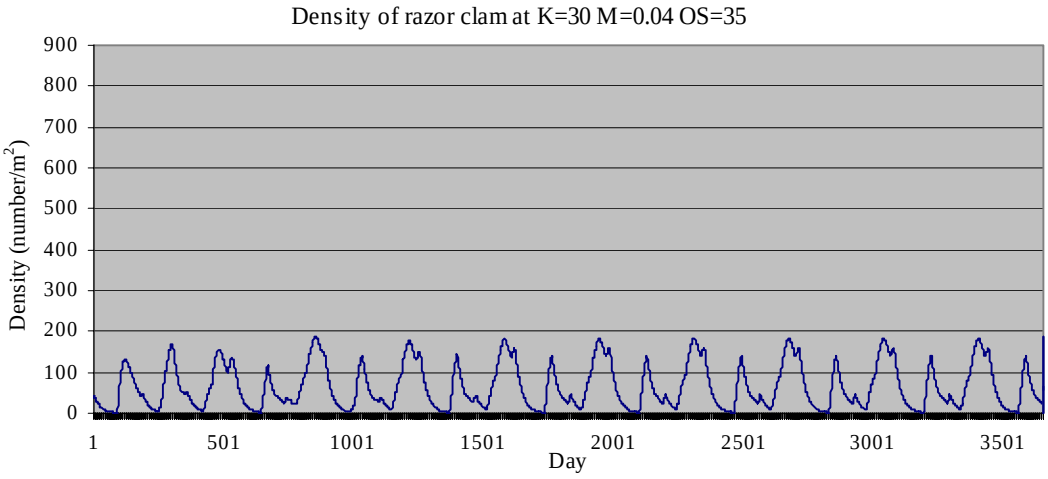

Density of razor clam at K=30 M=0.02 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
day

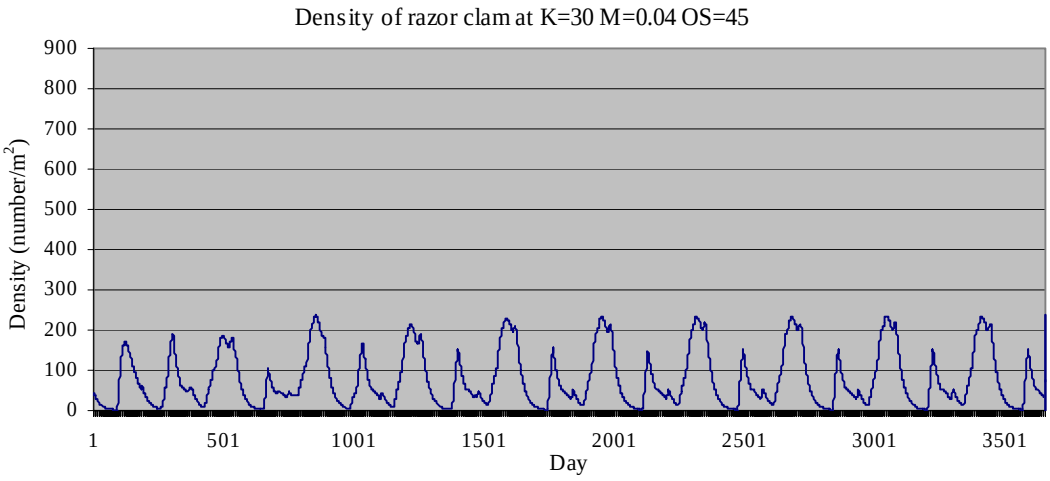

Density of razor clam at K=30 M=0.03 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

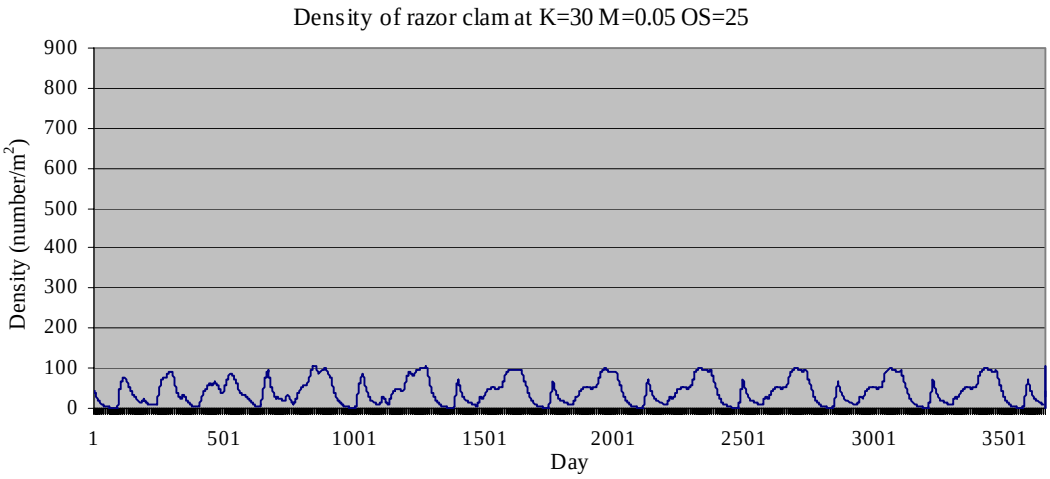

Density of razor clam at K=30 M=0.03 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

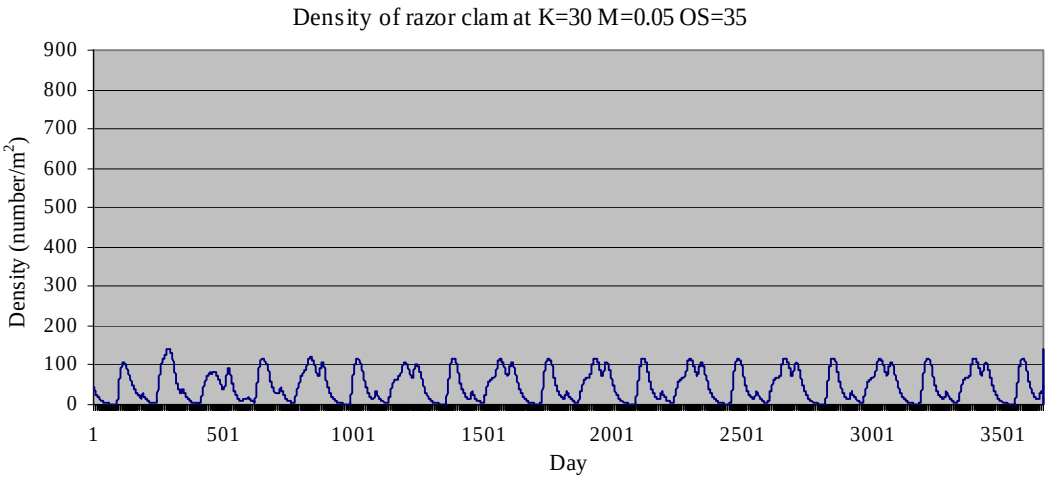

Density of razor clam at K=30 M=0.03 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

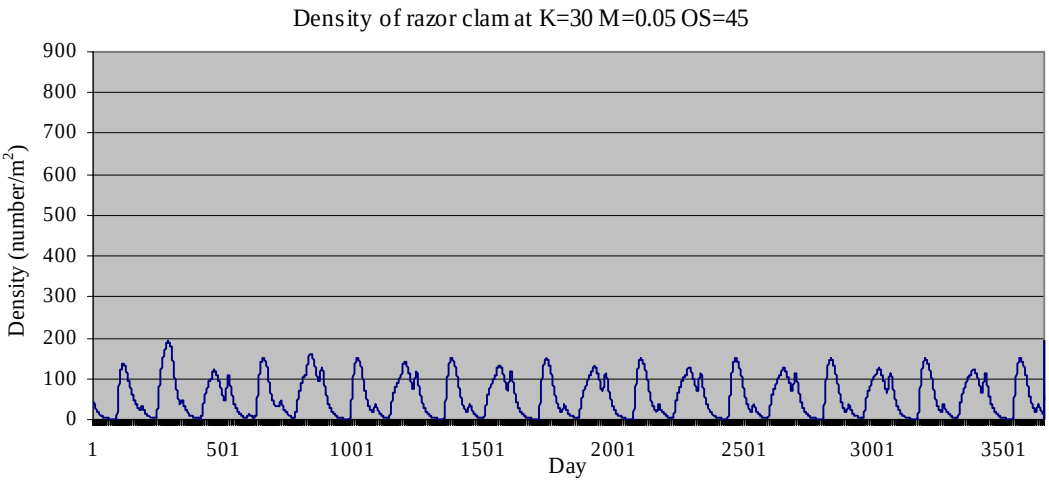

Density of razor clam at K=30 M=0.04 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

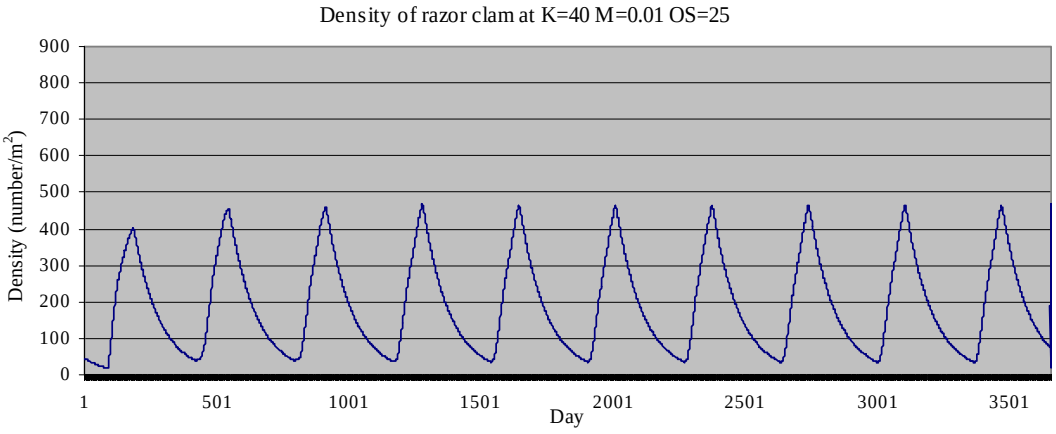

Density of razor clam at K=30 M=0.04 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=30 M=0.04 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=30 M=0.05 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=30 M=0.05 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=30 M=0.05 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.01 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
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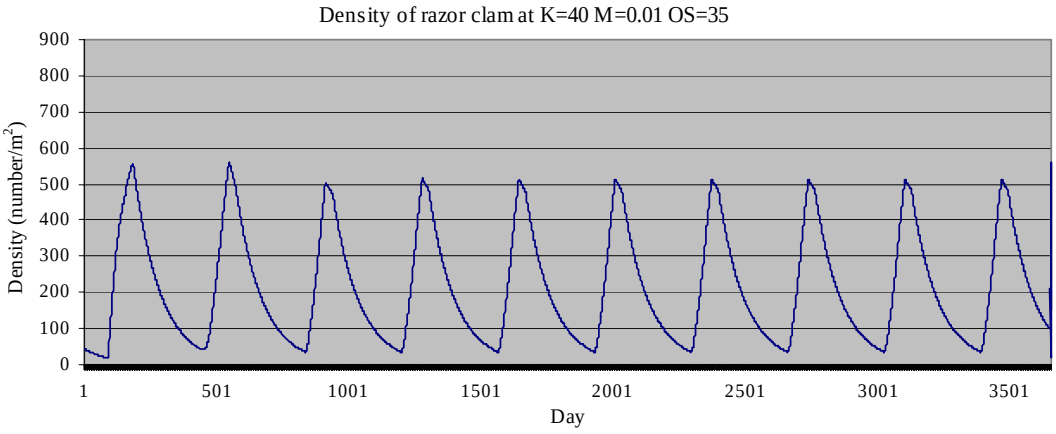
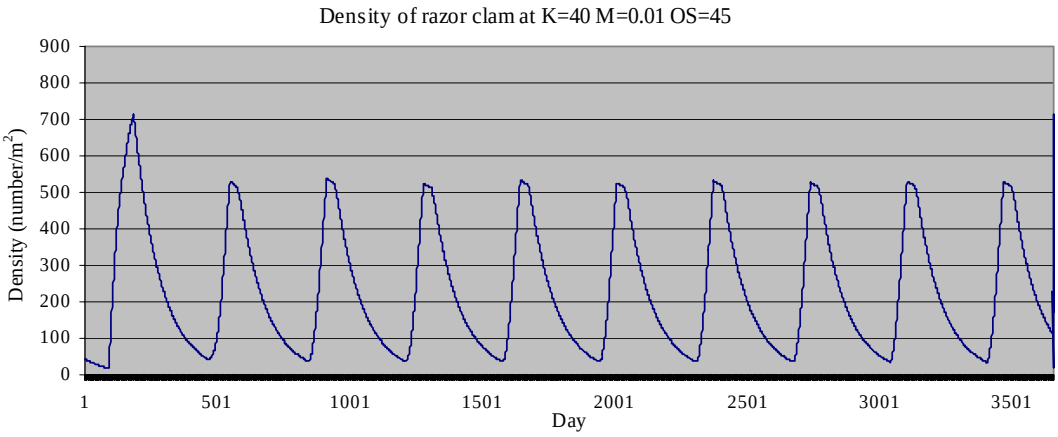
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.01 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.01 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
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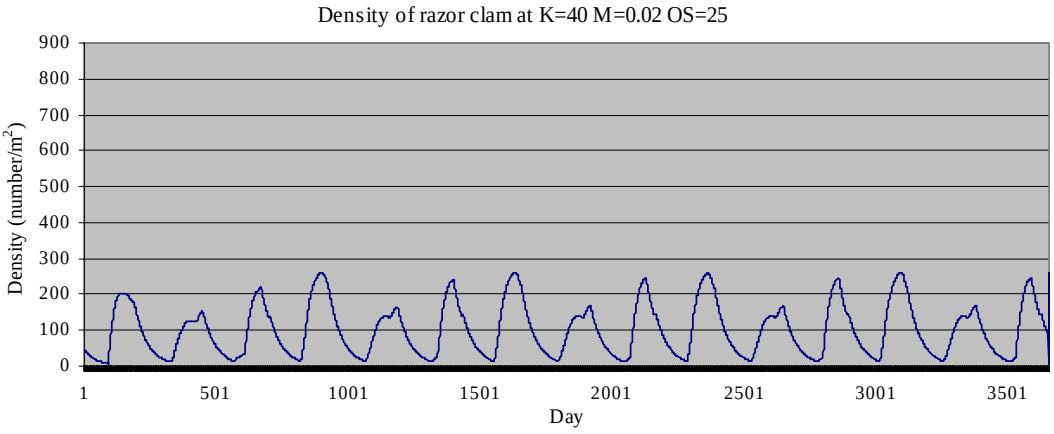
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.02 OS=25
Density (number/m2)
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800
700
600
500
400
300
200
100
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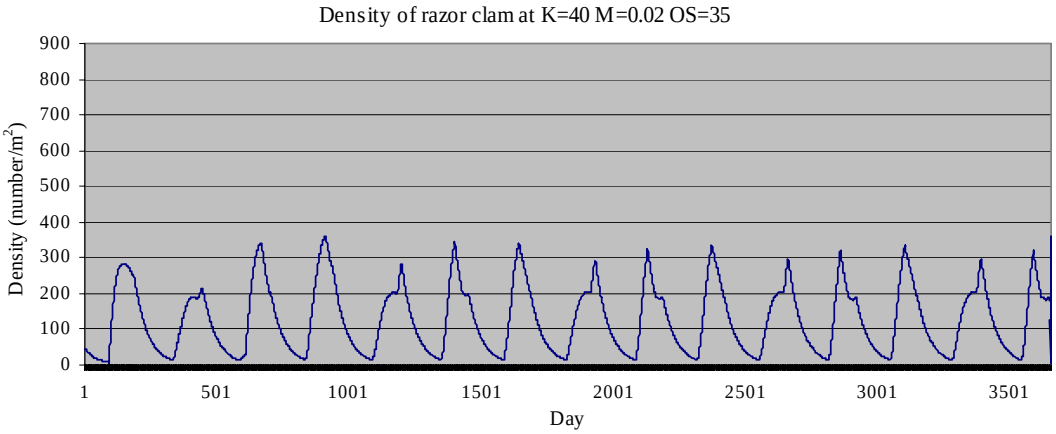
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.02 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
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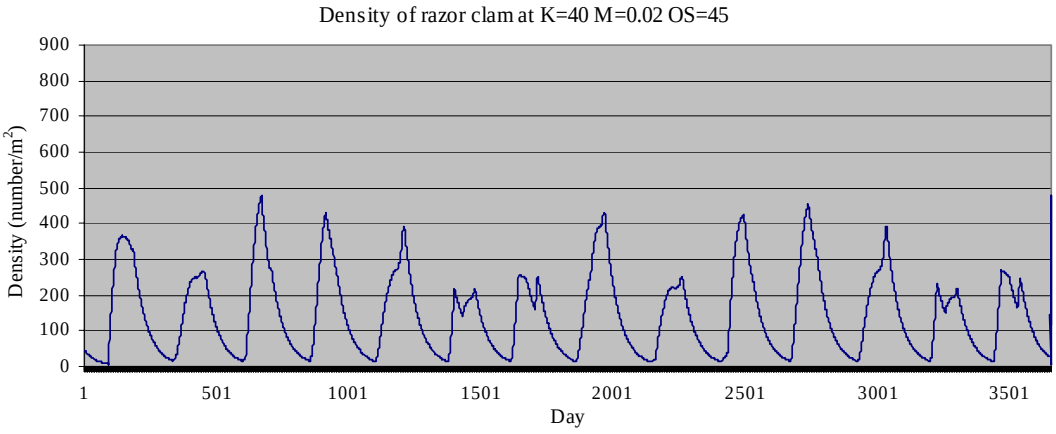
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.02 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
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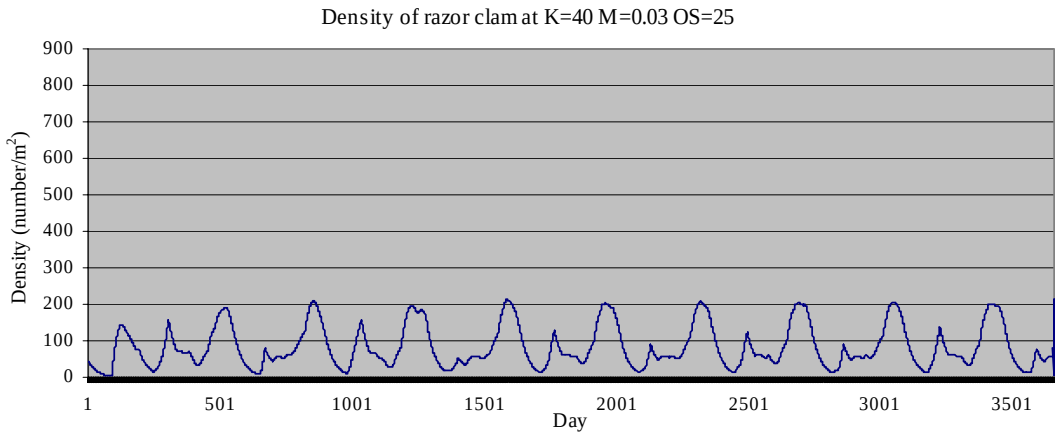
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.03 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
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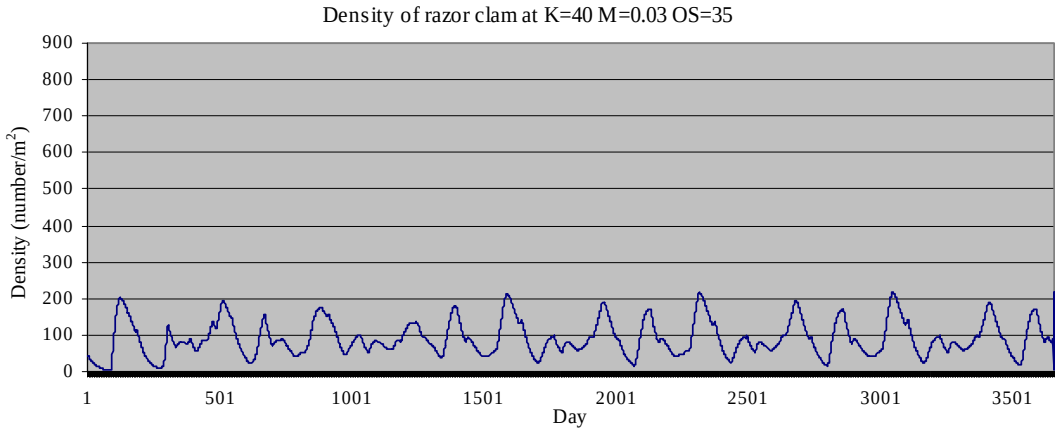
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.03 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
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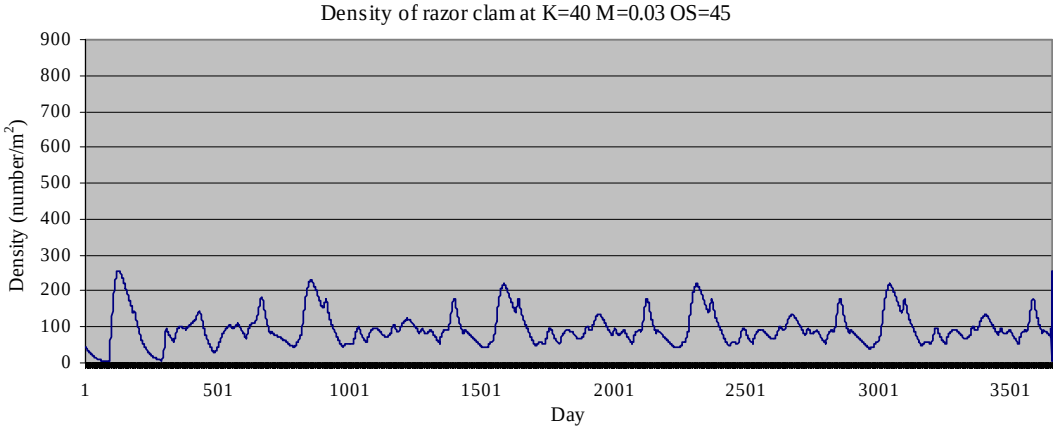
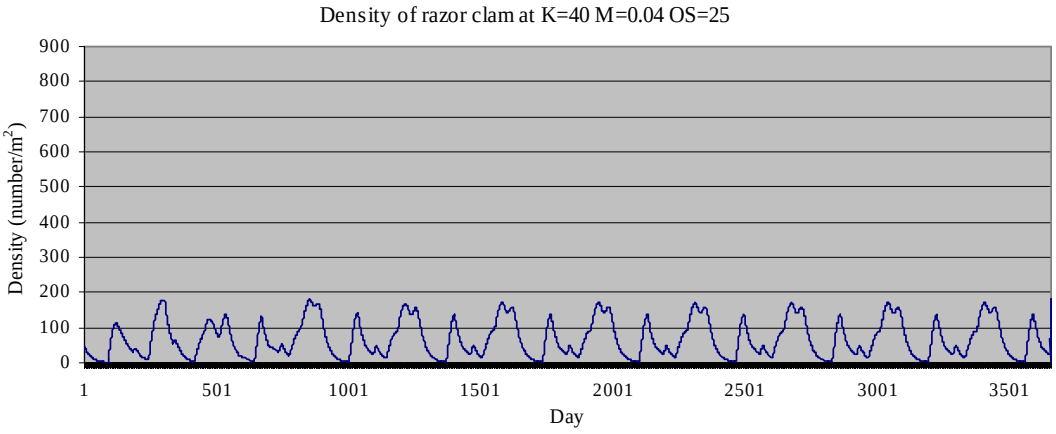
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.03 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.04 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
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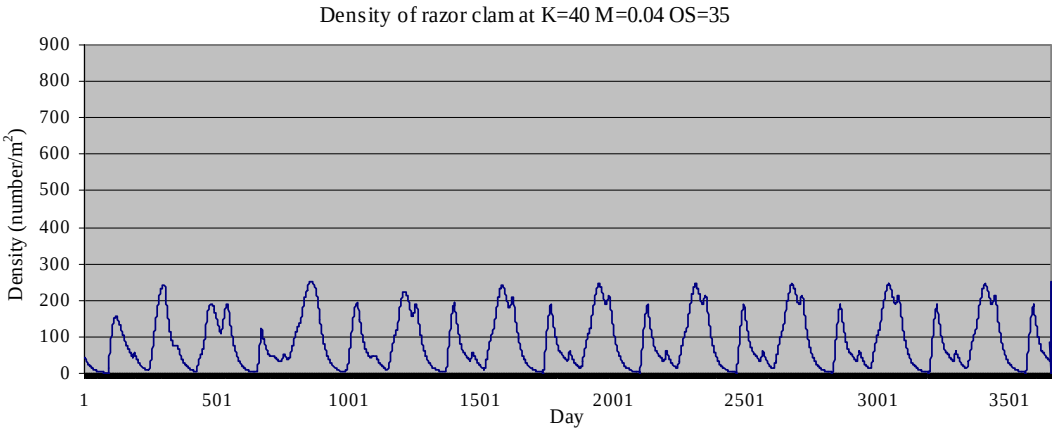
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.04 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
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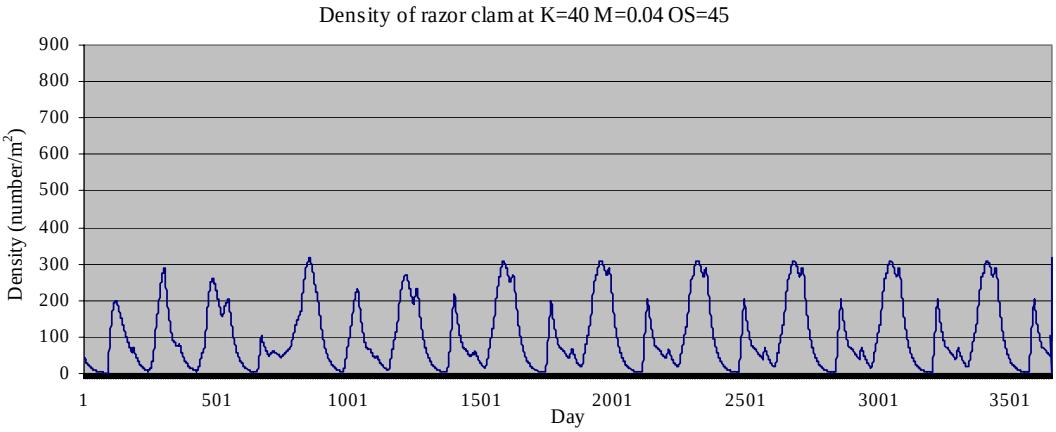
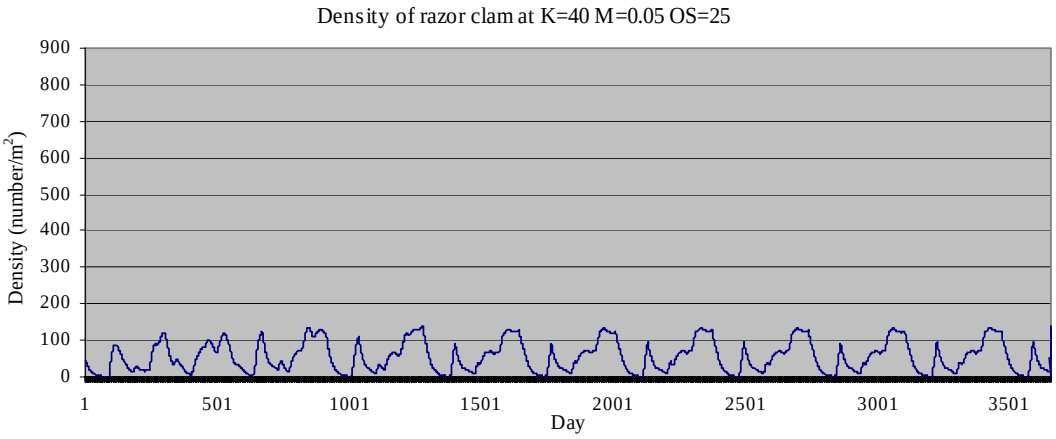
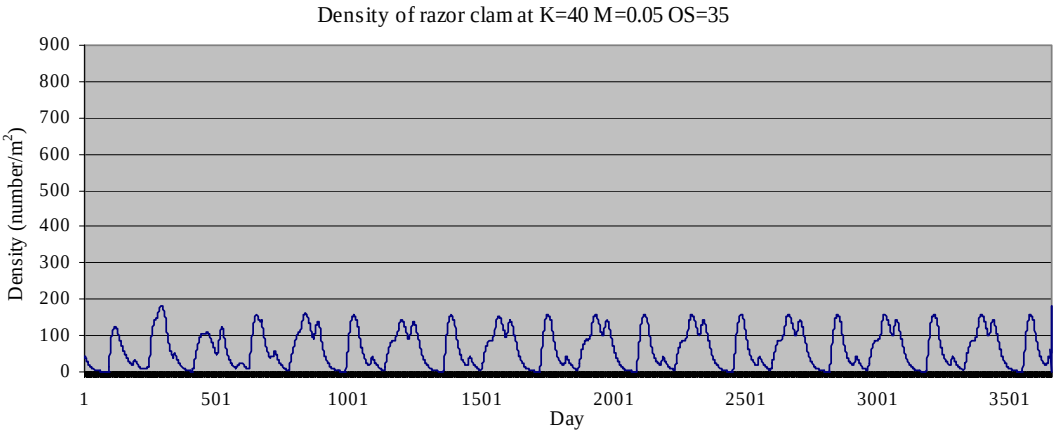
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.04 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.05 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.05 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
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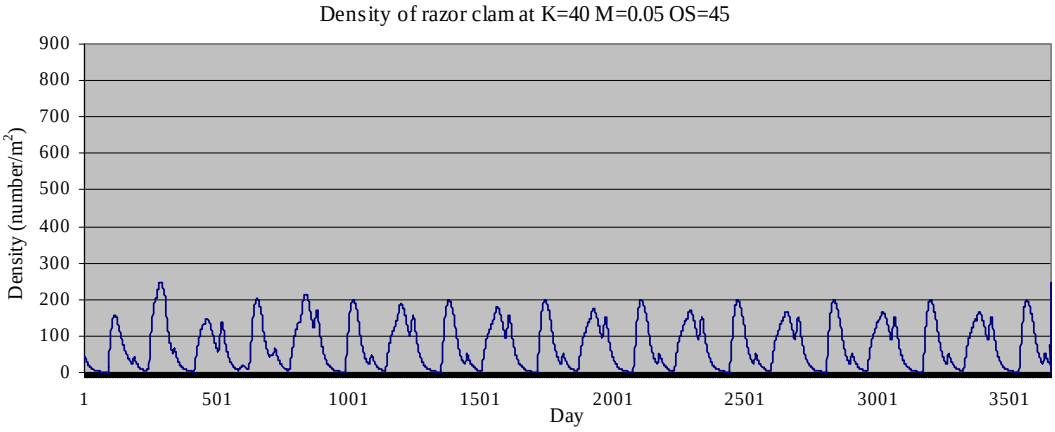
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=40 M=0.05 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
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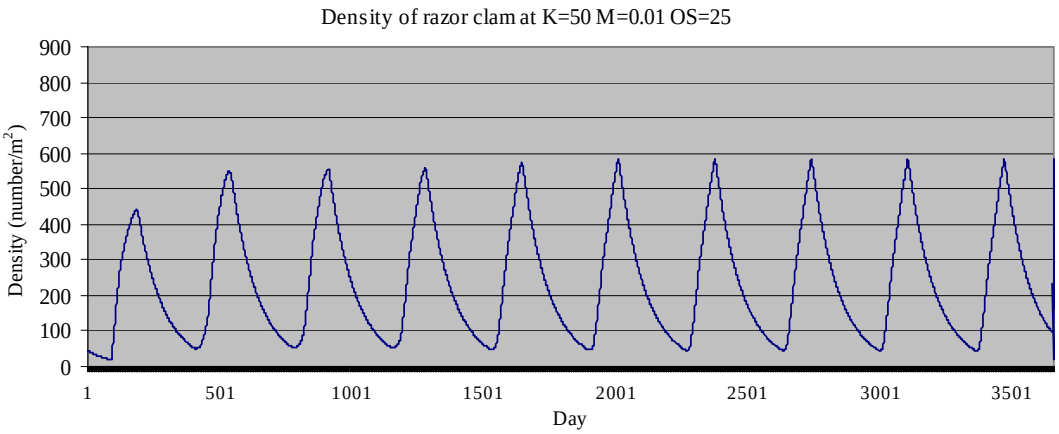
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.01 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
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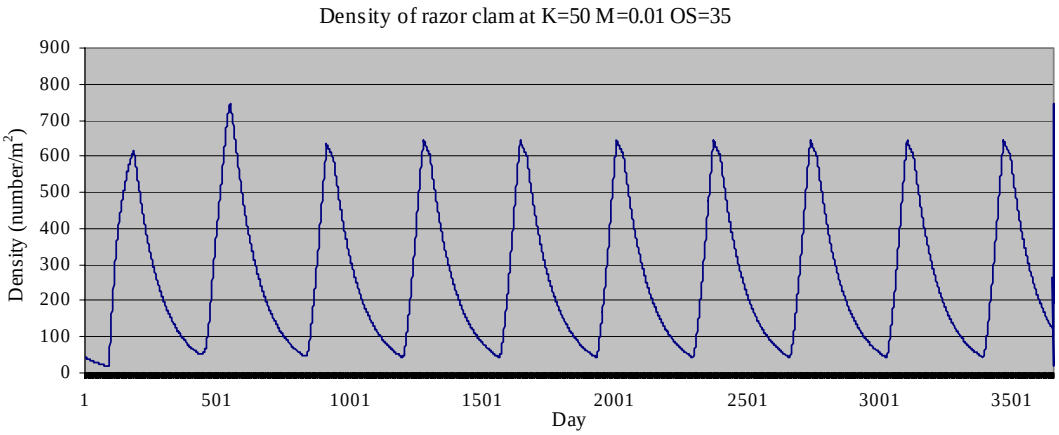
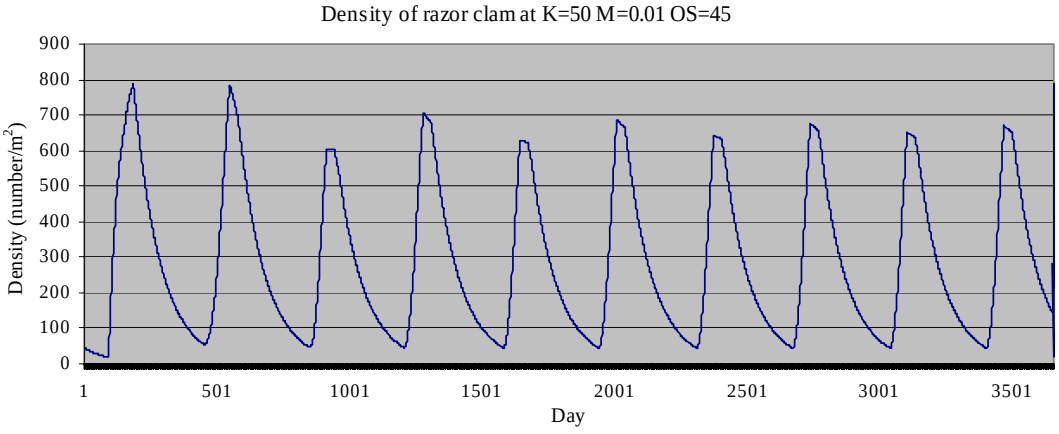
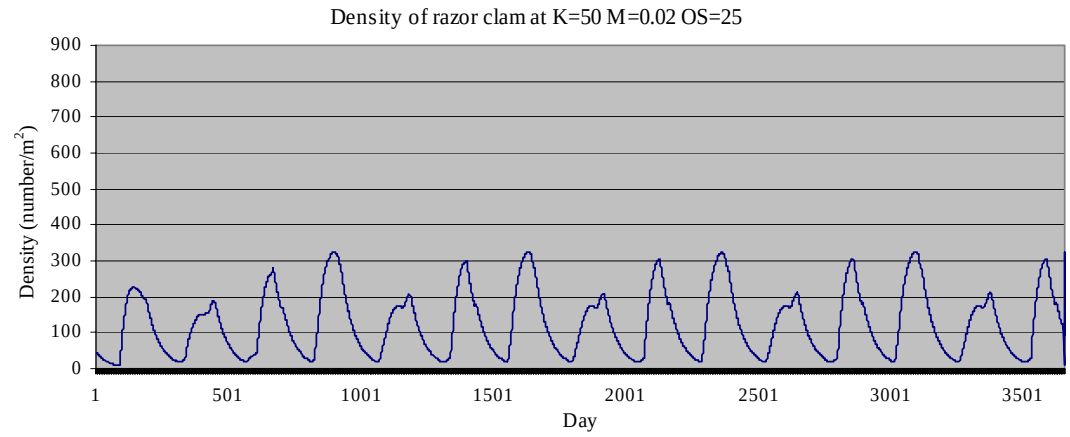
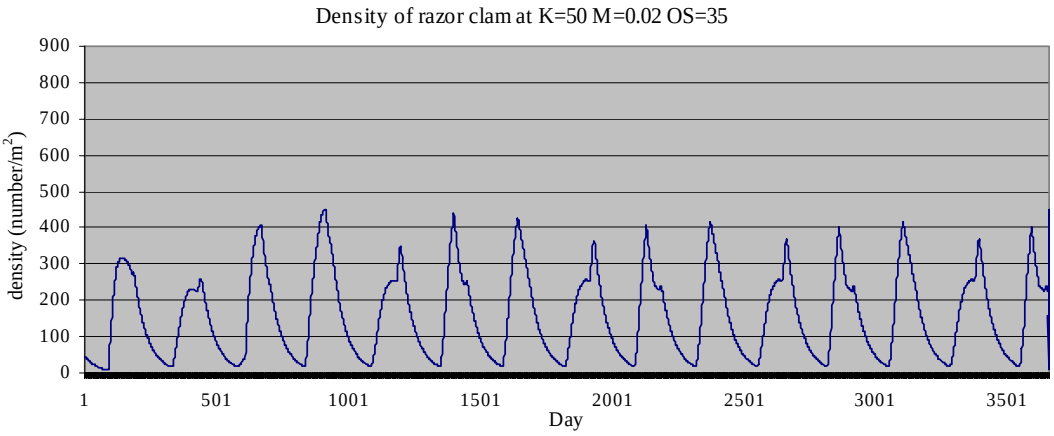
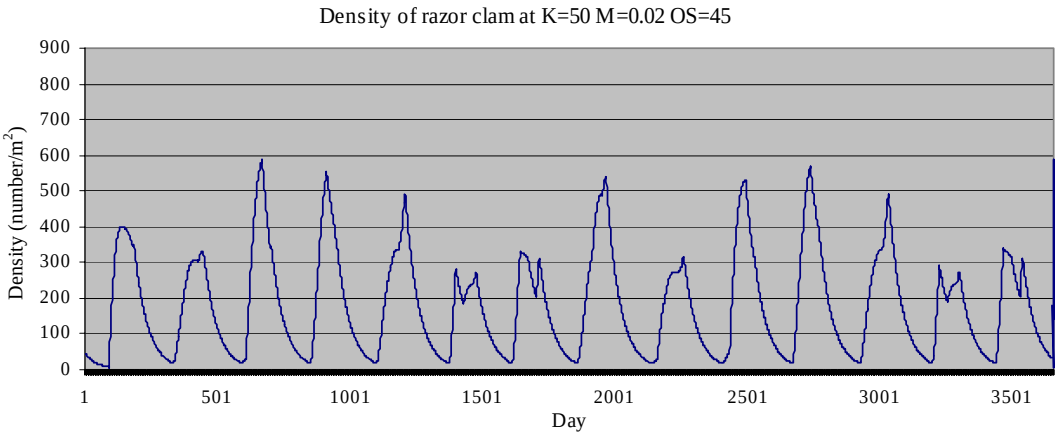
1
501
1001
1501
2001
2501
3001
3501
Day

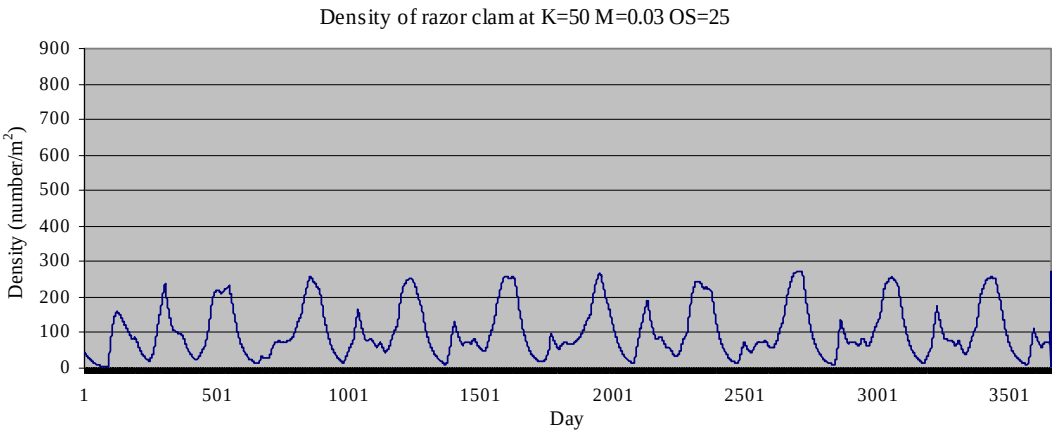

Density of razor clam at K=50 M=0.01 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.01 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.02 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.02 OS=35
density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.02 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.03 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
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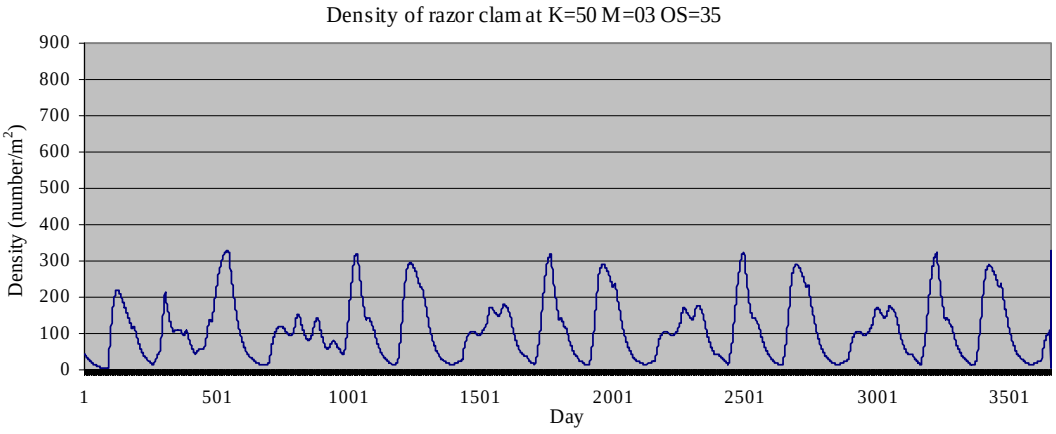
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=03 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
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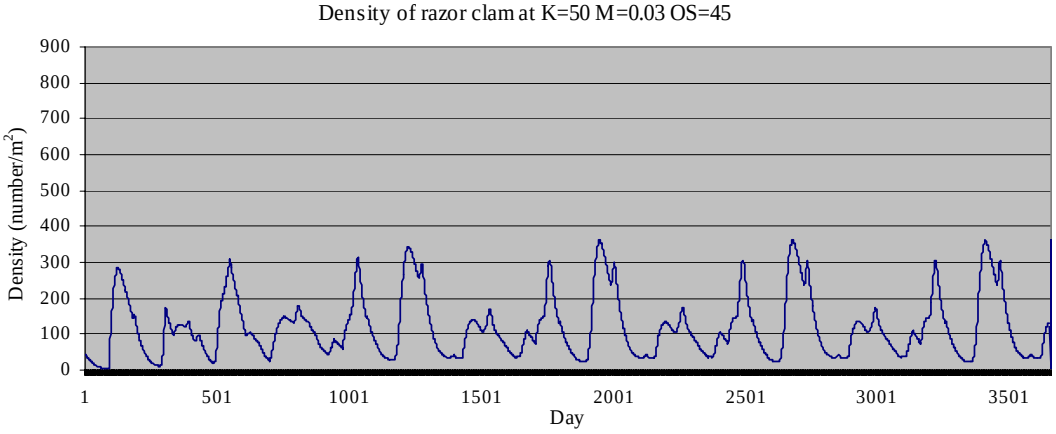
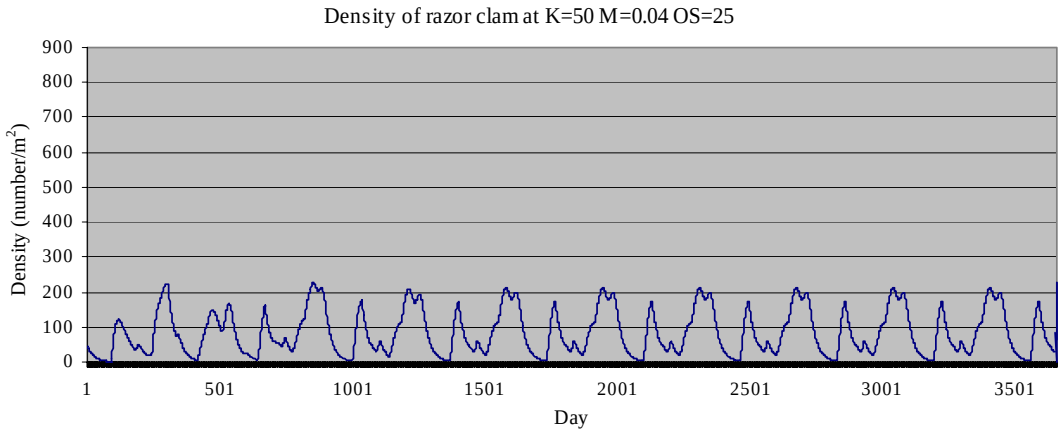
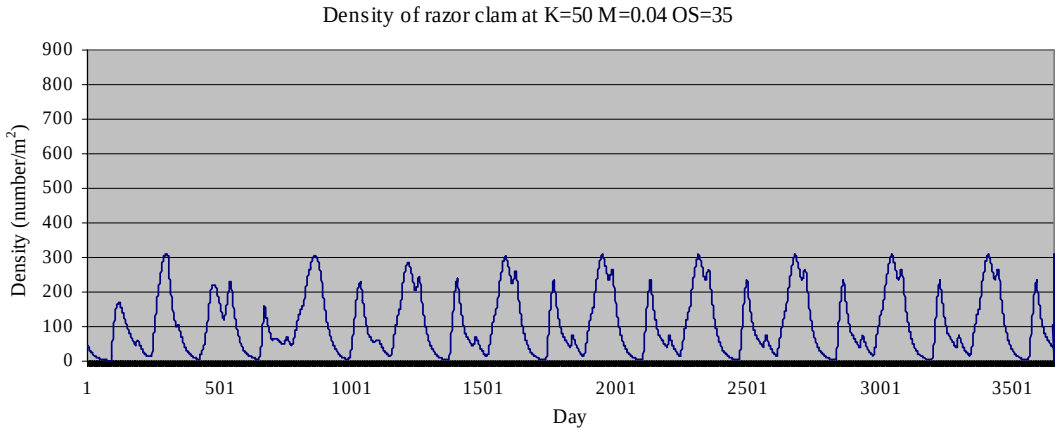
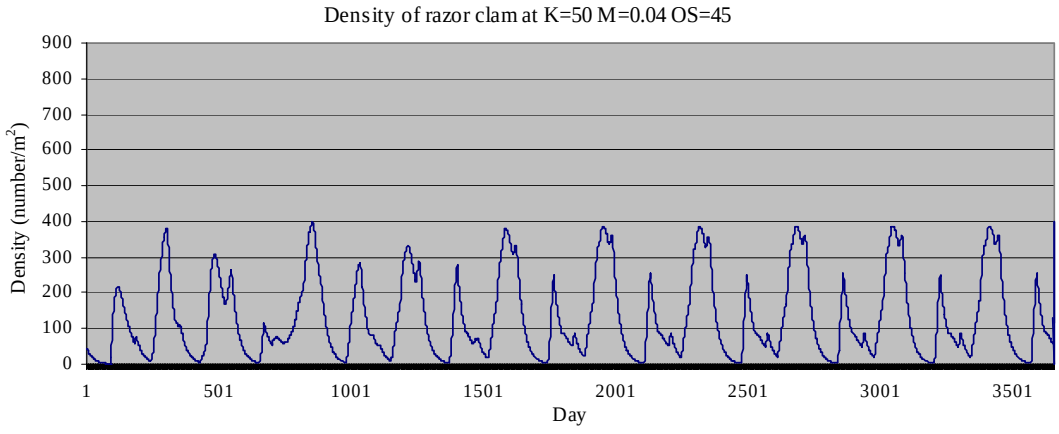
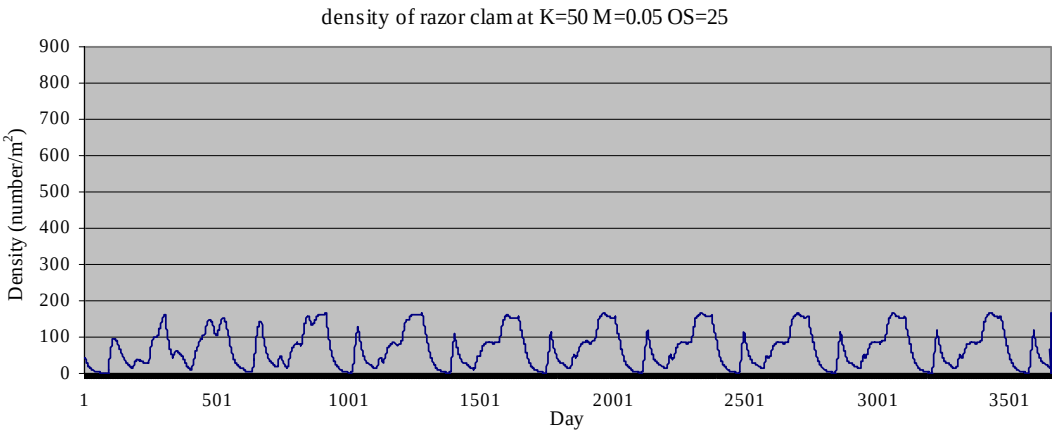
501
1001
1501
2001
2501
3001
3501
Day

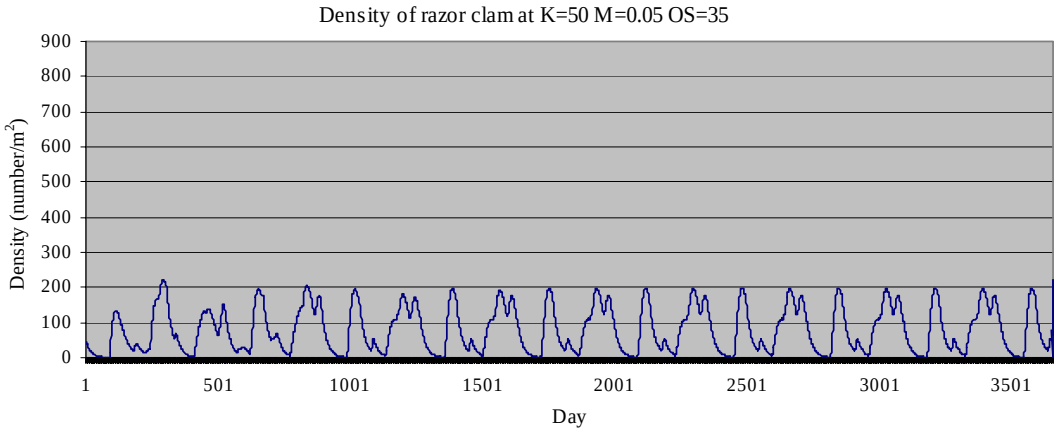

Density of razor clam at K=50 M=0.03 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

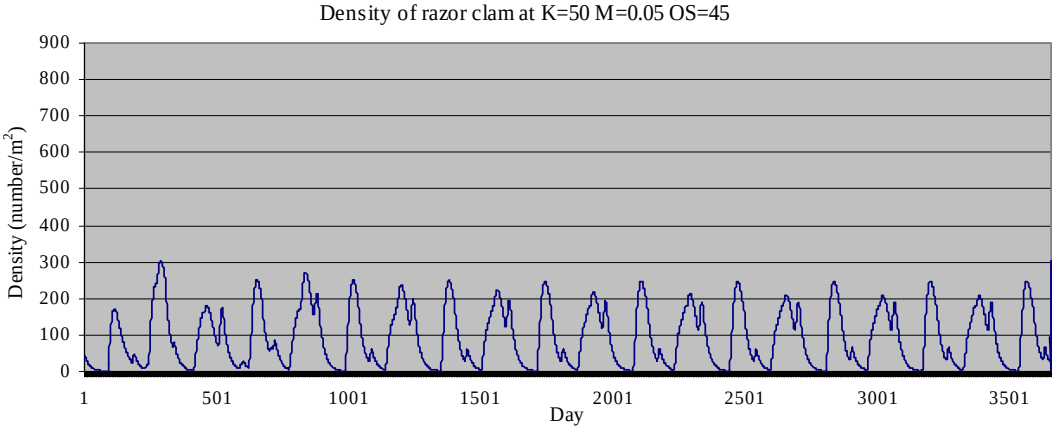

Density of razor clam at K=50 M=0.04 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

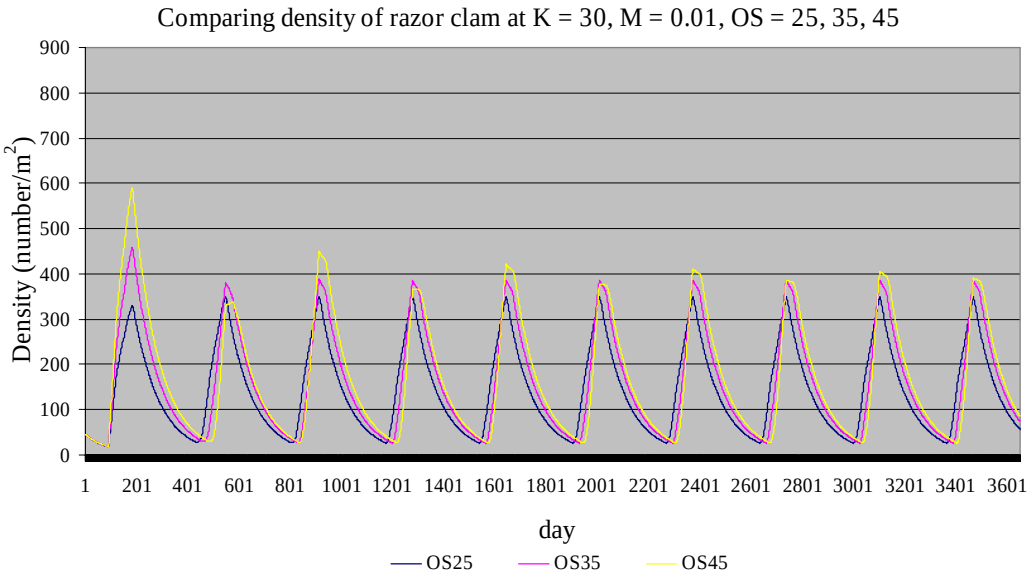

Density of razor clam at K=50 M=0.04 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

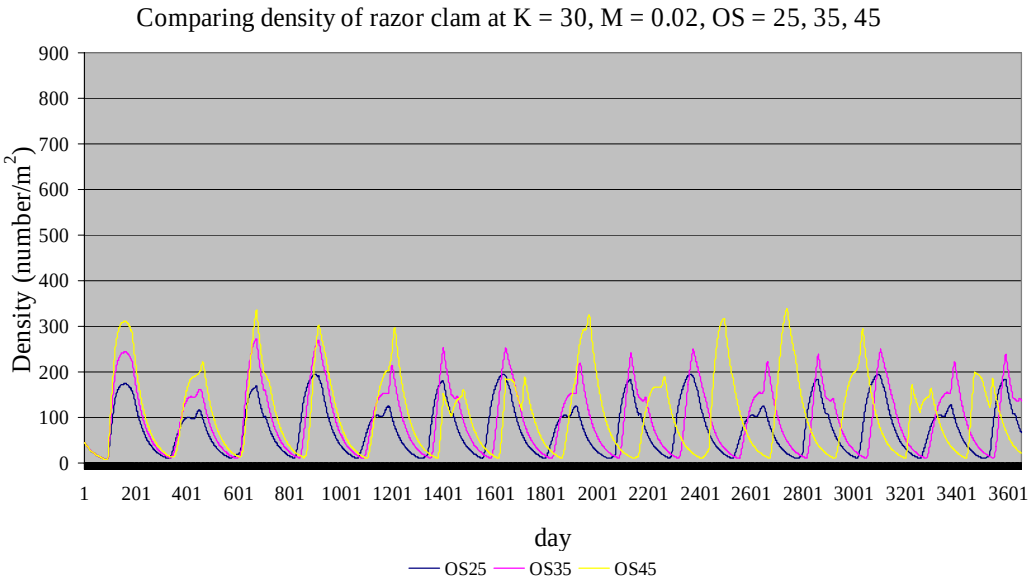

Density of razor clam at K=50 M=0.04 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

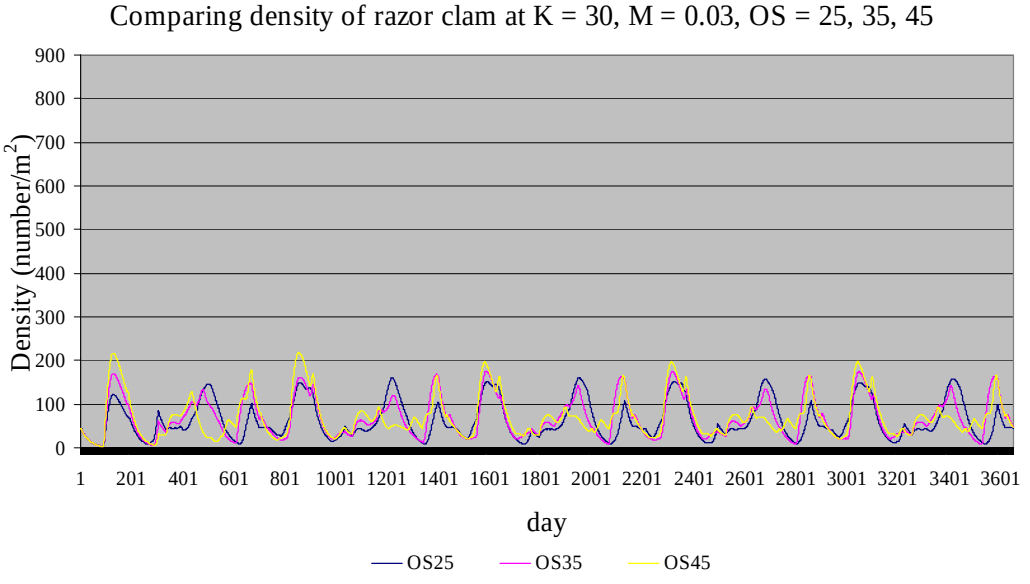

density of razor clam at K=50 M=0.05 OS=25
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Density of razor clam at K=50 M=0.05 OS=35
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day

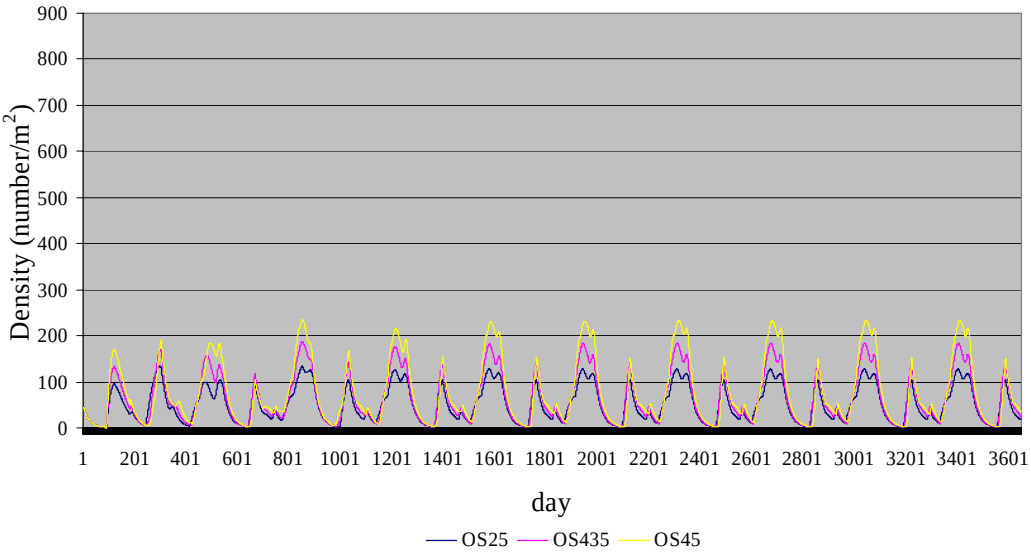

Density of razor clam at K=50 M=0.05 OS=45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1
501
1001
1501
2001
2501
3001
3501
Day


Comparing density of razor clam at K = 30, M = 0.01, OS = 25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25
OS35
OS45

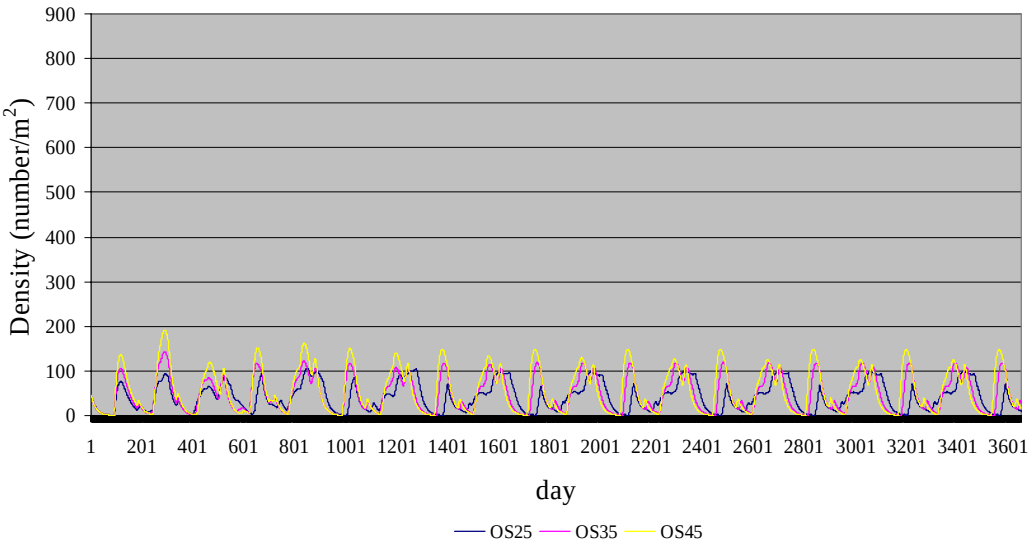

Comparing density of razor clam at K = 30, M = 0.02, OS = 25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25
OS35
OS45


Comparing density of razor clam at K = 30, M = 0.03, OS = 25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25
OS35
OS45

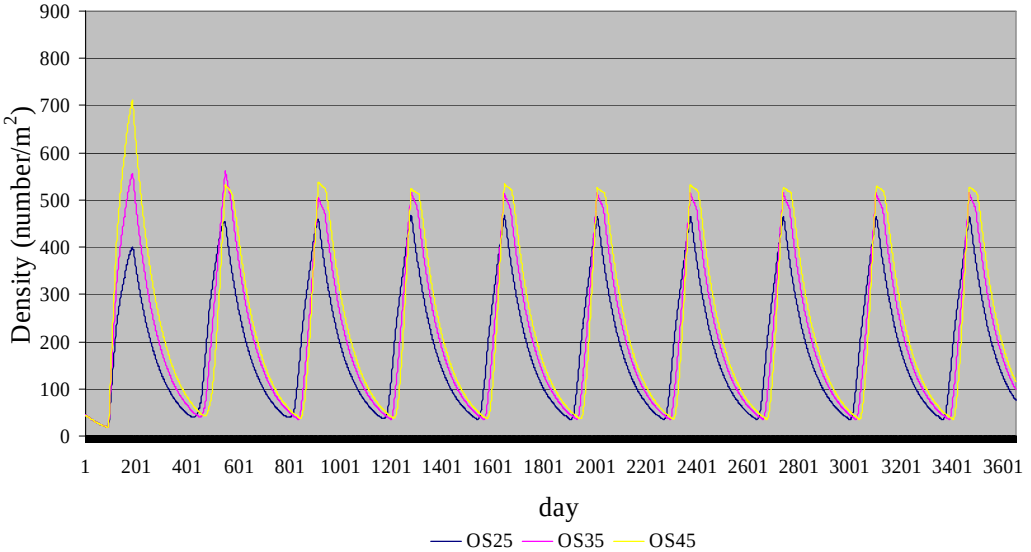
Comparing density of razor clam at K = 30, M = 0.04, OS = 25, 35, 45



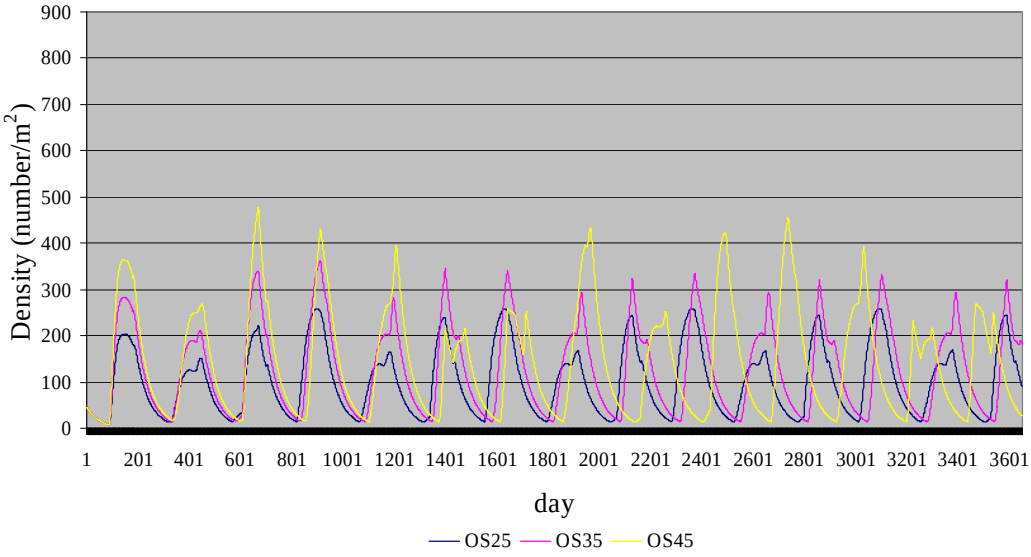
Comparing density of razor clam at K = 30, M = 0.05, OS = 25, 35, 45



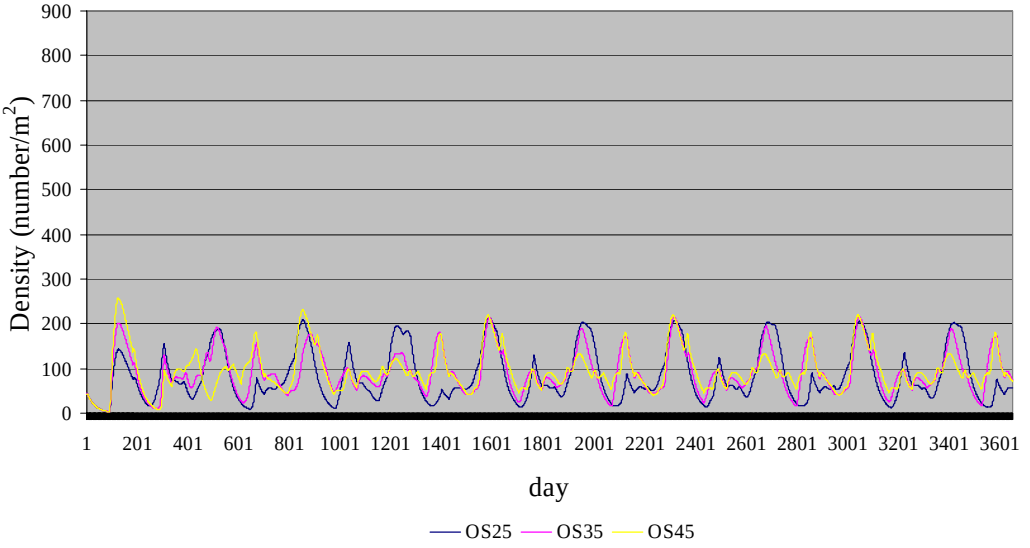
Comparing density of razor clam at K = 40, M = 0.01, OS = 25, 35, 45



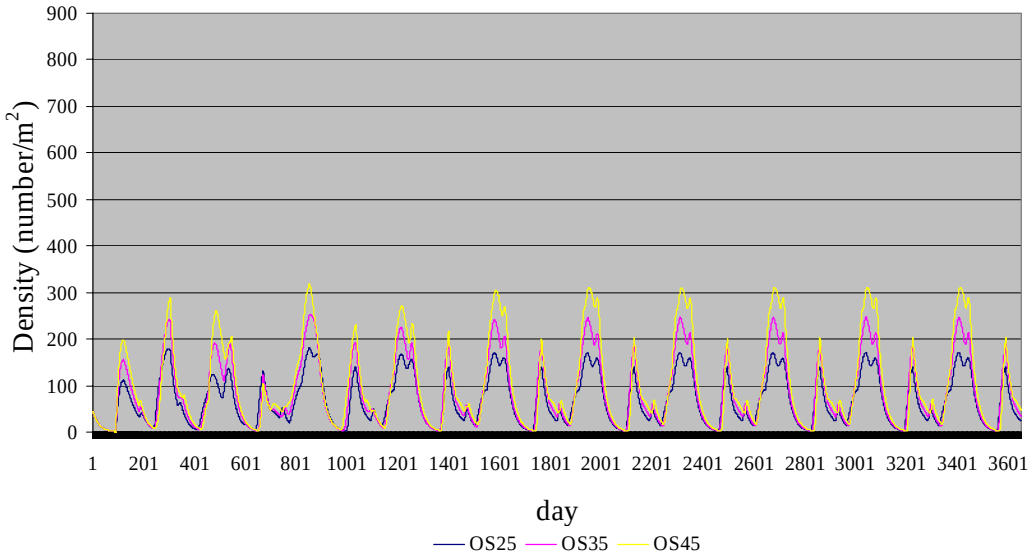
Comparing density of razor clam at K = 40, M = 0.02, OS = 25, 35, 45

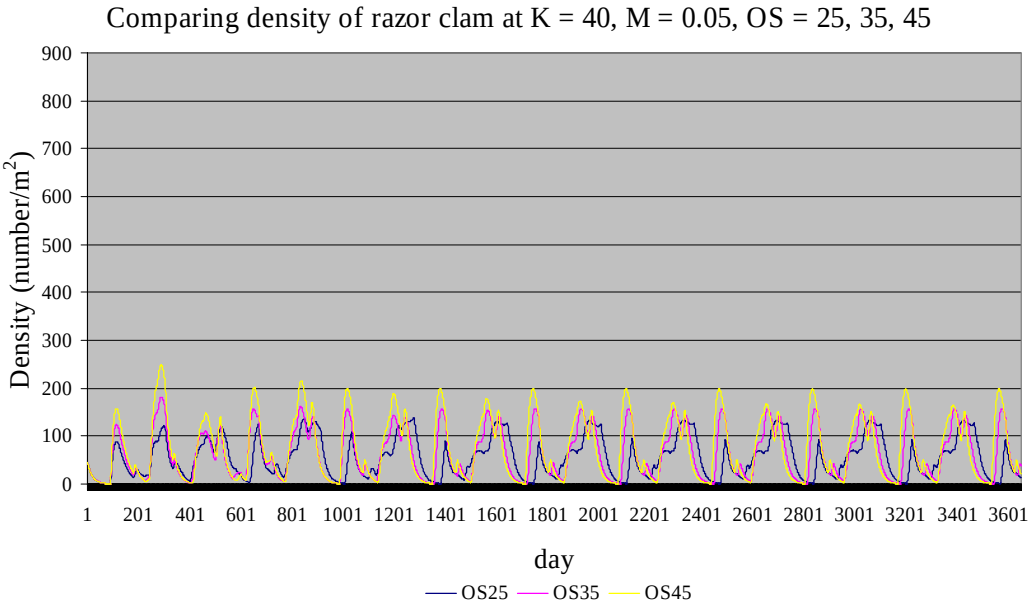


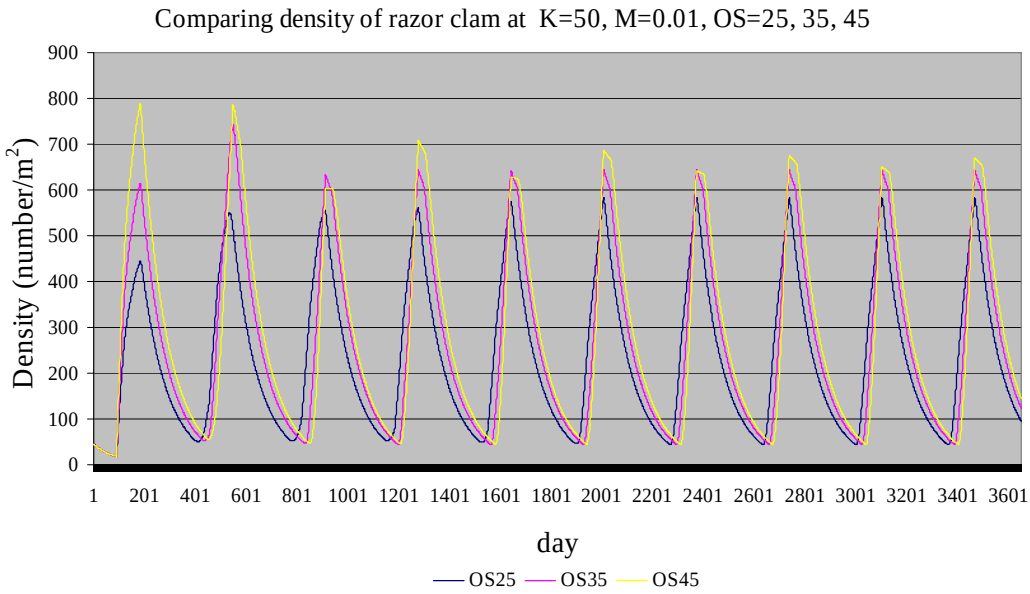
Comparing density os razor clam at K = 40, M = 0.03, OS = 25, 35, 45

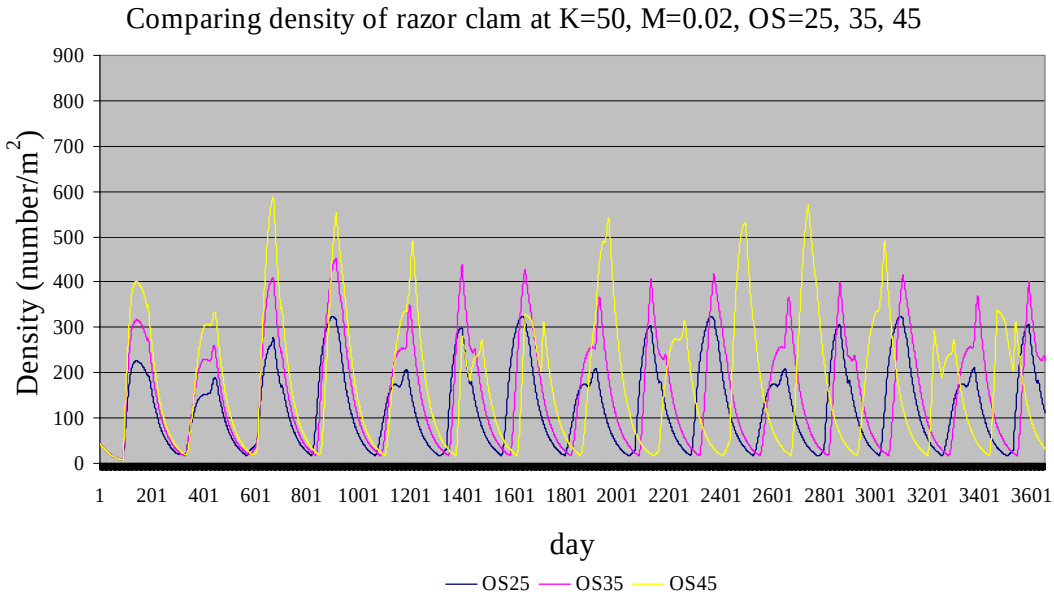


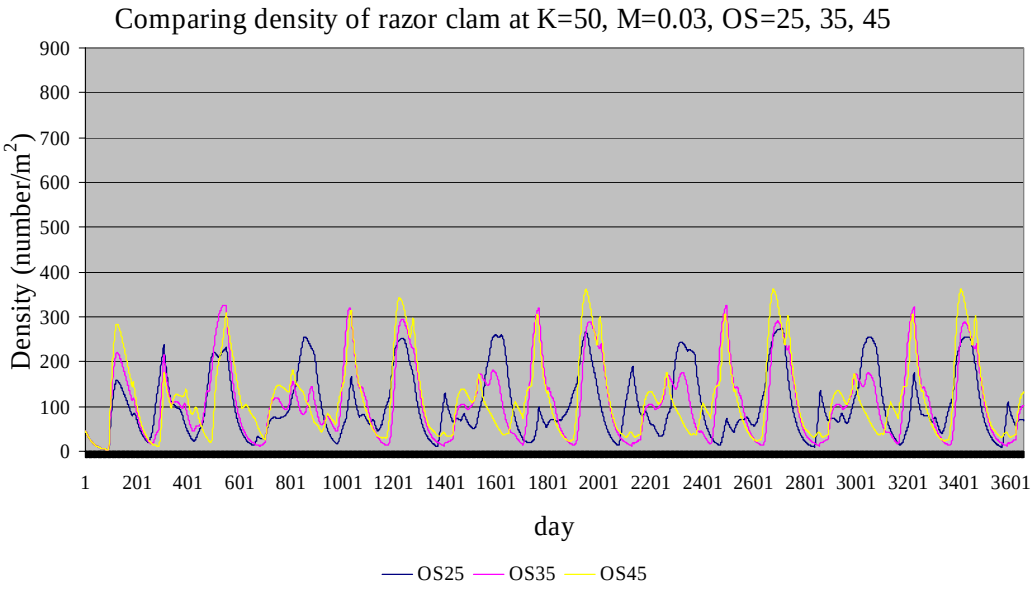
Comparing density of razor clam at K = 40, M = 0.04, OS = 25, 35, 45

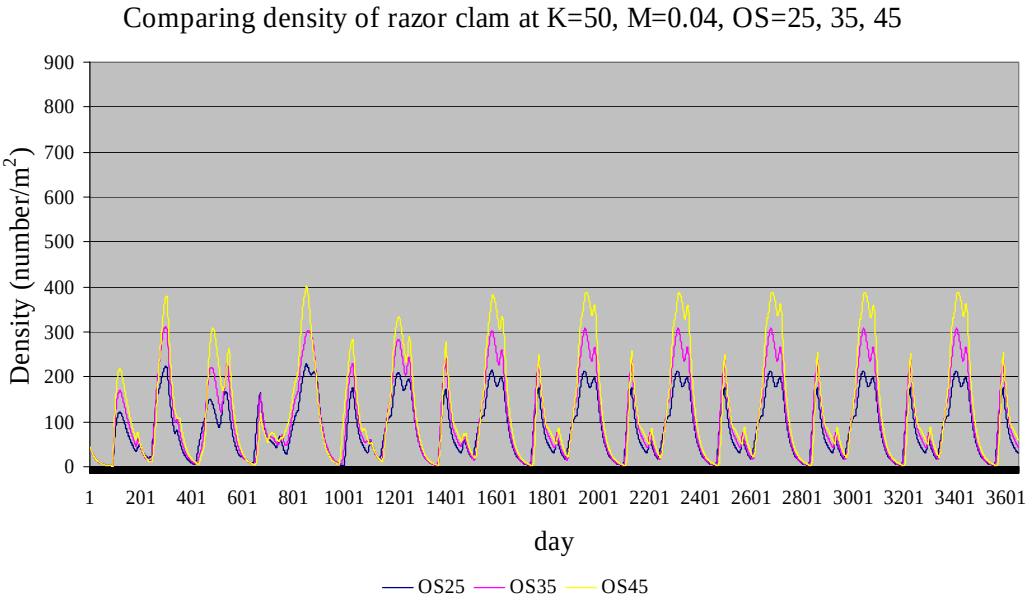


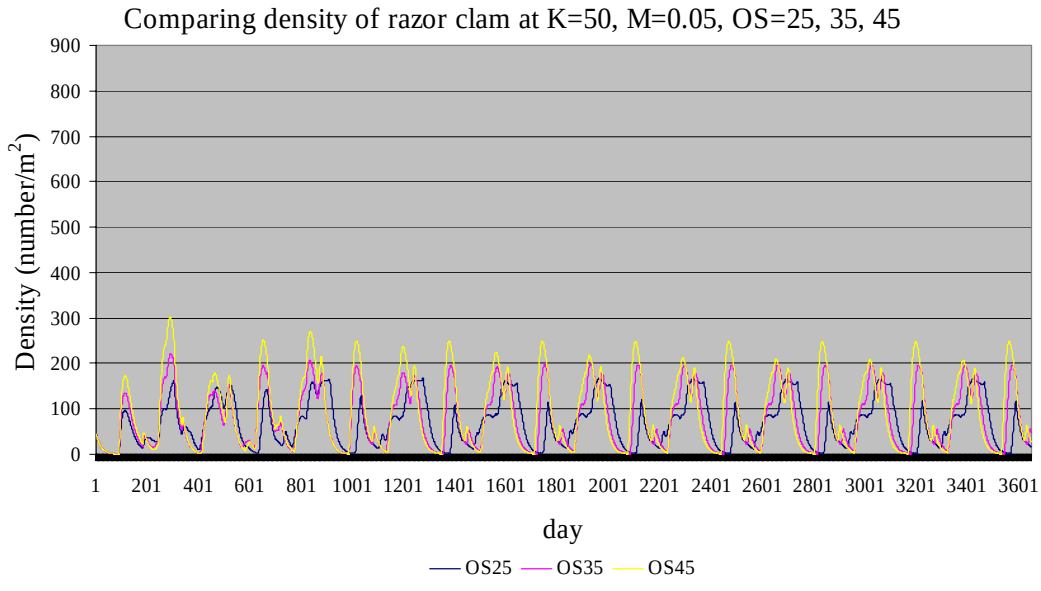

Comparing density of razor clam at K = 40, M = 0.05, OS = 25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25 OS35 OS45

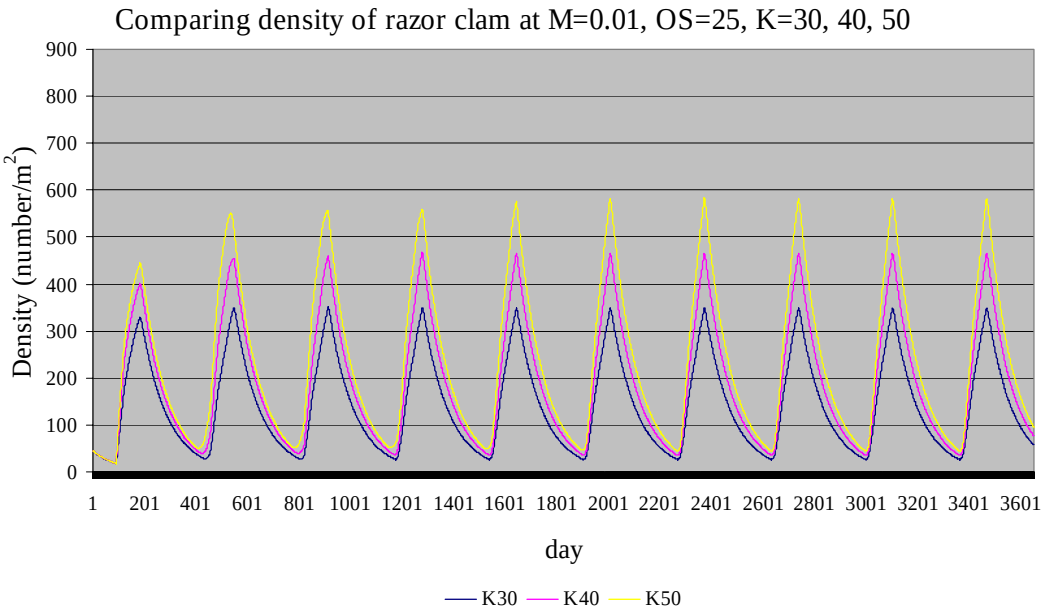

Comparing density of razor clam at K=50, M=0.01, OS=25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25 OS35 OS45

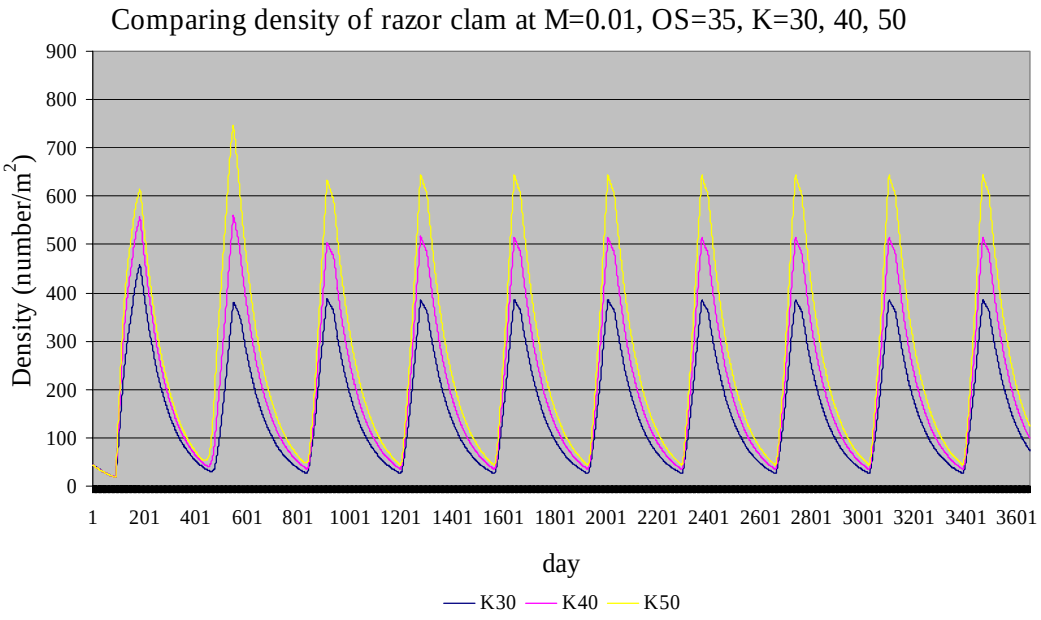

Comparing density of razor clam at K=50, M=0.02, OS=25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25 OS35 OS45

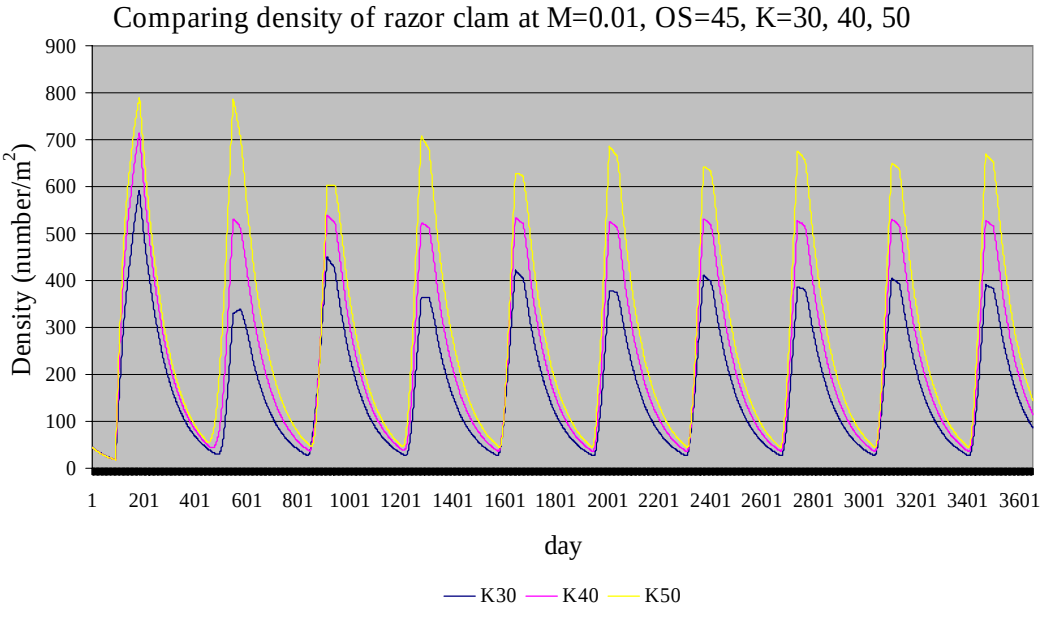

Comparing density of razor clam at K=50, M=0.03, OS=25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25 OS35 OS45

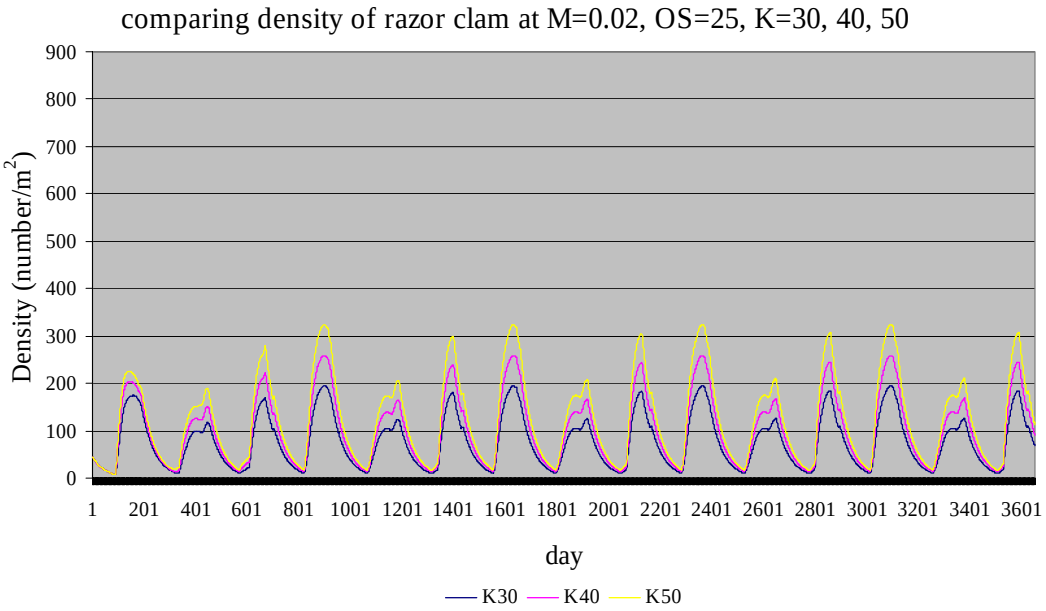

Comparing density of razor clam at K=50, M=0.04, OS=25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25 OS35 OS45

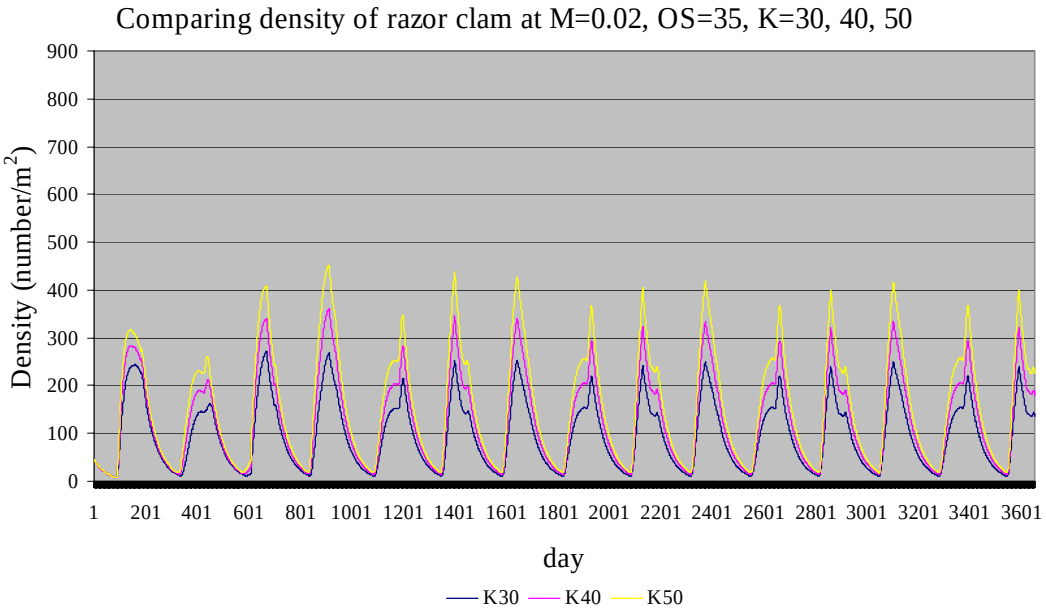

Comparing density of razor clam at K=50, M=0.05, OS=25, 35, 45
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
OS25 OS35 OS45

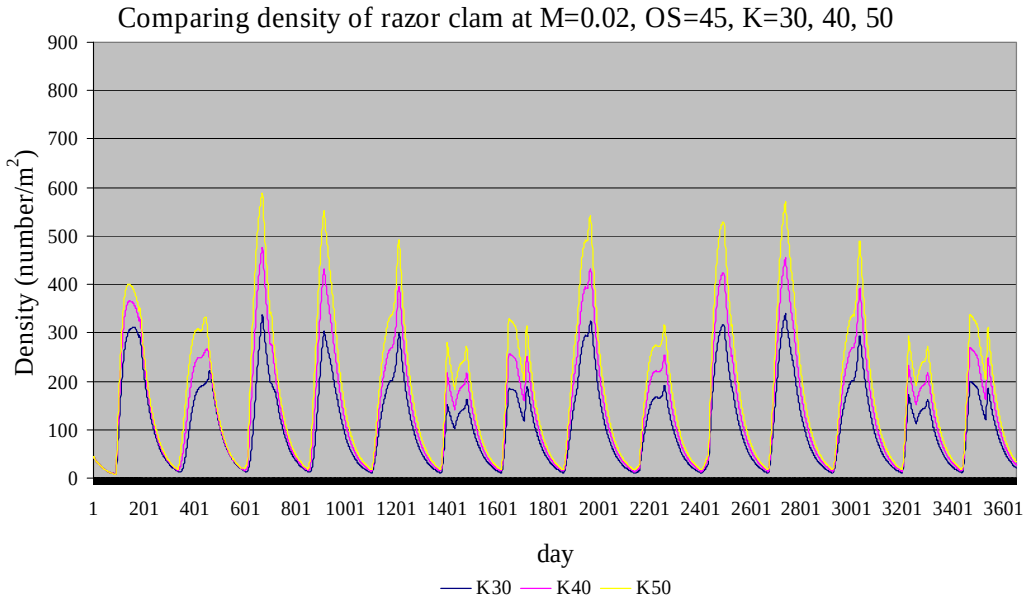

Comparing density of razor clam at M=0.01, OS=25, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50


Comparing density of razor clam at M=0.01, OS=35, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50

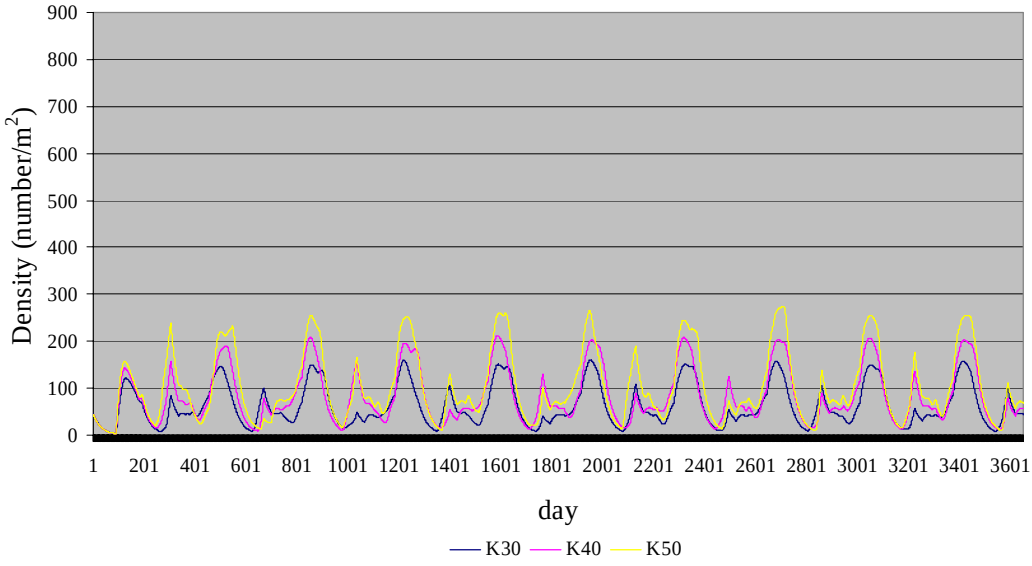

Comparing density of razor clam at M=0.01, OS=45, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50


comparing density of razor clam at M=0.02, OS=25, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50

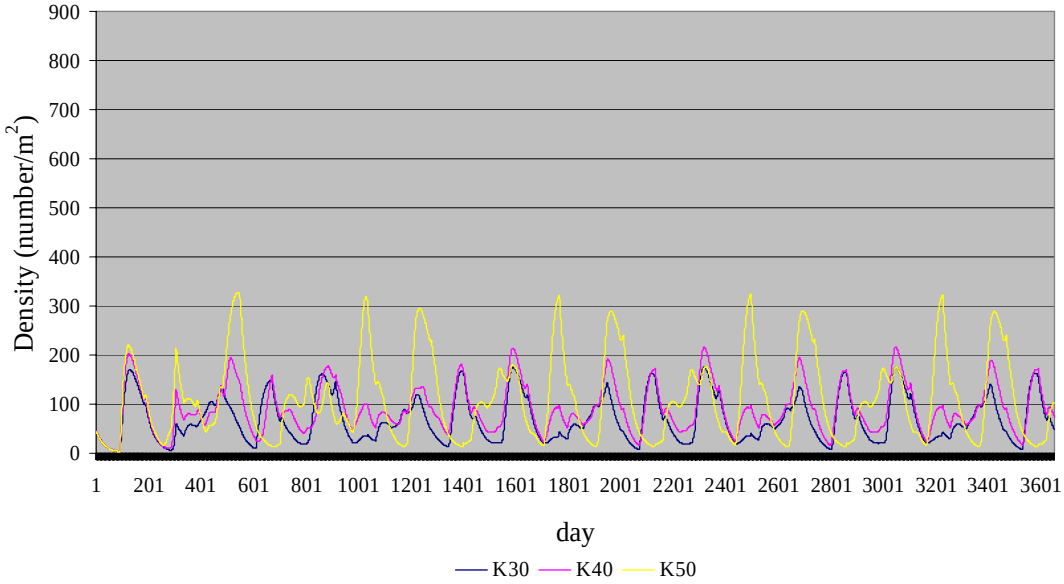

Comparing density of razor clam at M=0.02, OS=35, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50


Comparing density of razor clam at M=0.02, OS=45, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50

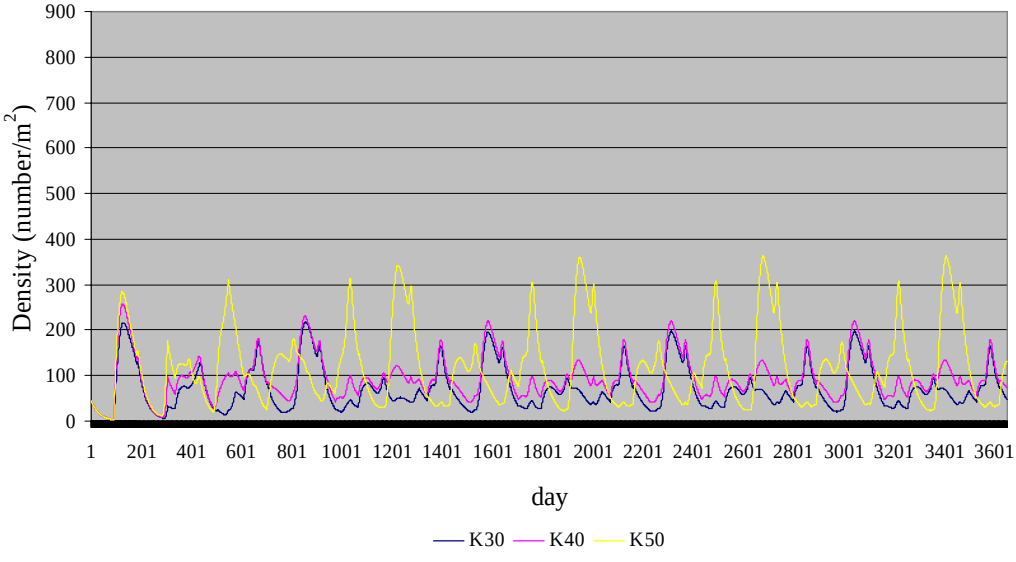
Comparing density of razor clam at M=0.03, OS=25, K=30, 40, 50



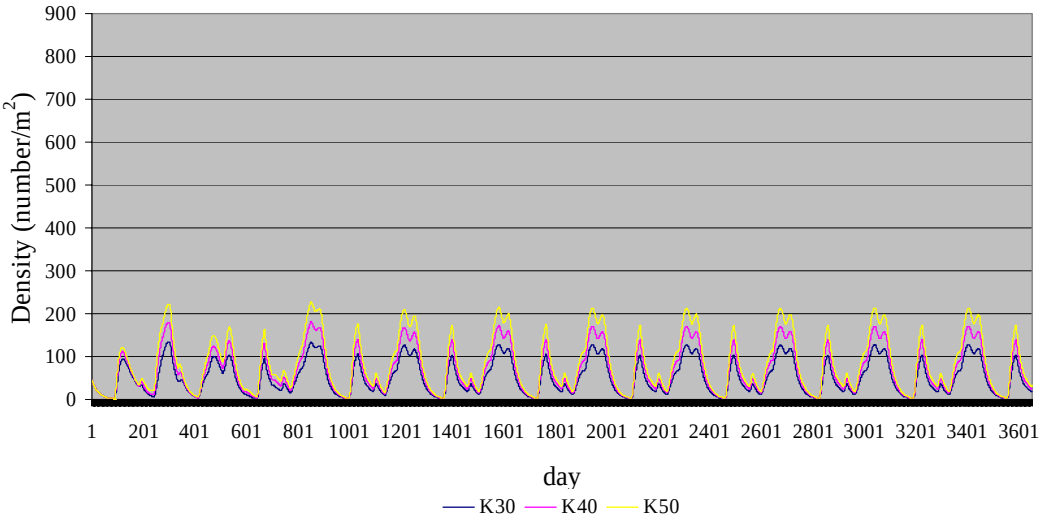
Comparing density of razor clam at M=0.03, OS=35, K=30, 40, 50



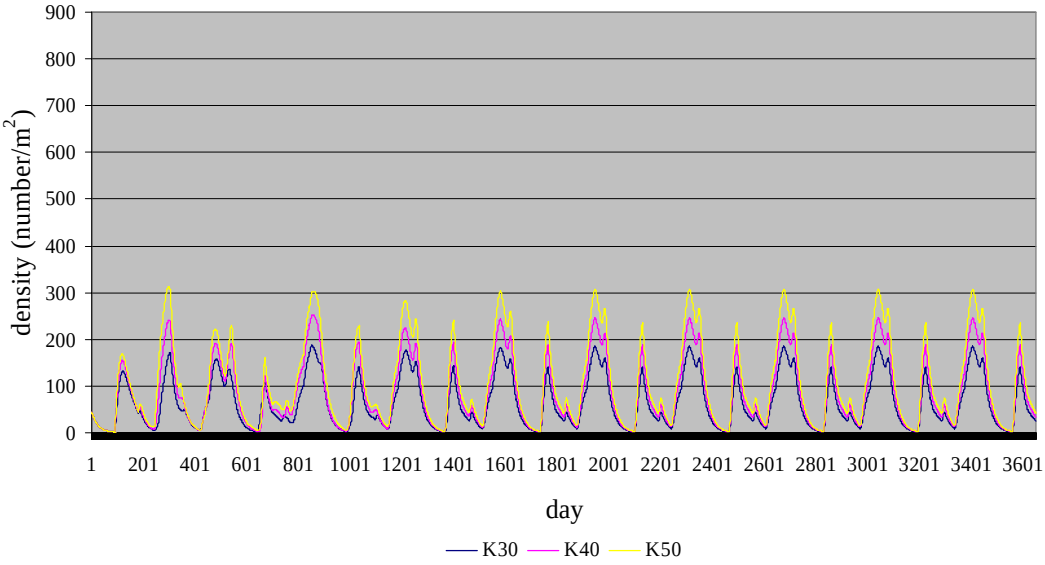
Comparing density of razor clam at M=0.03, OS=45, K=30, 40, 50



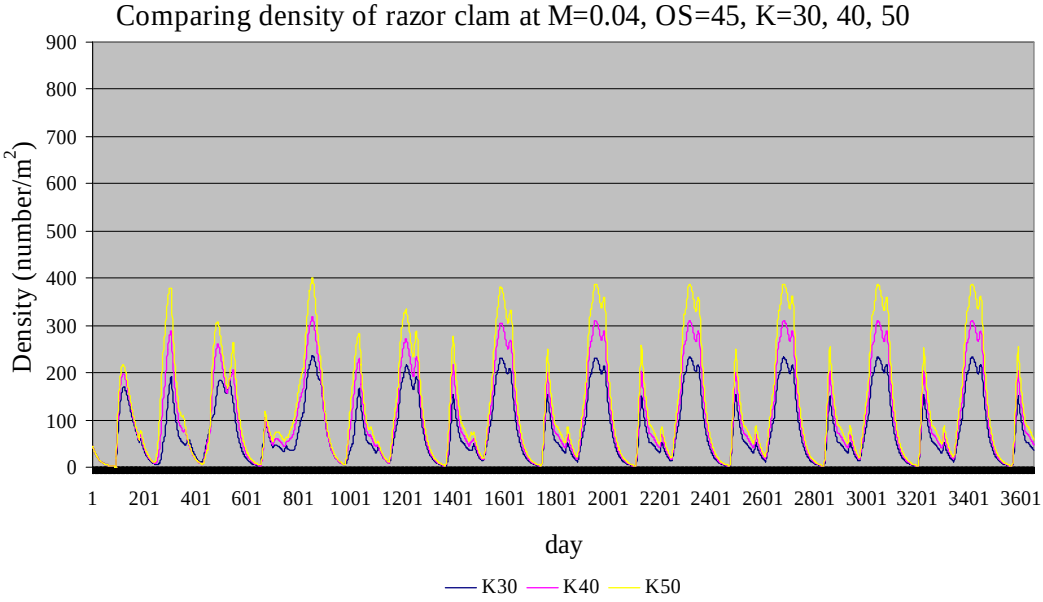
Comparing density of razor clam at M=0.04, OS=25, K=30, 40, 50

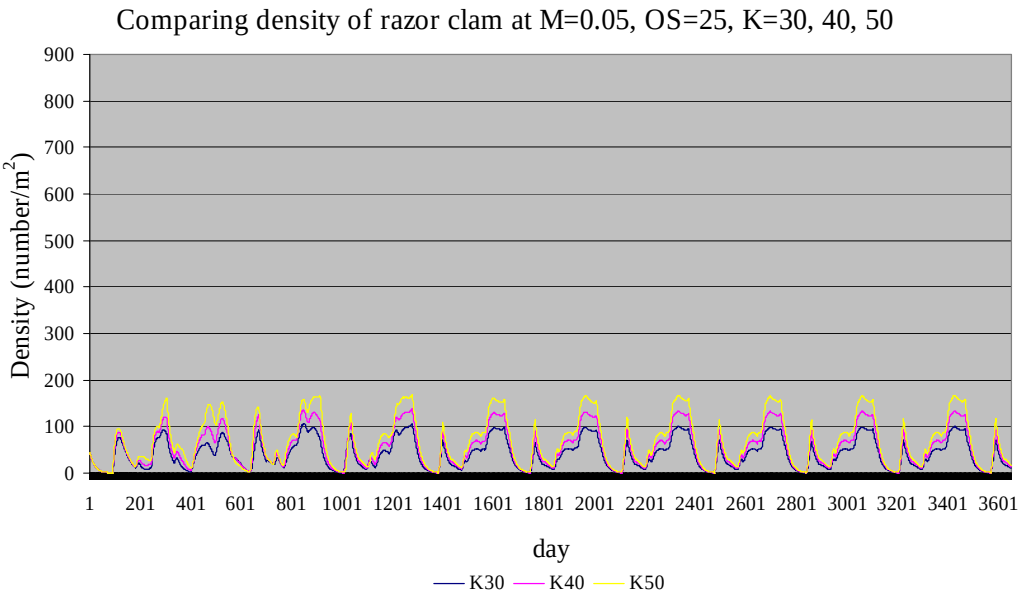


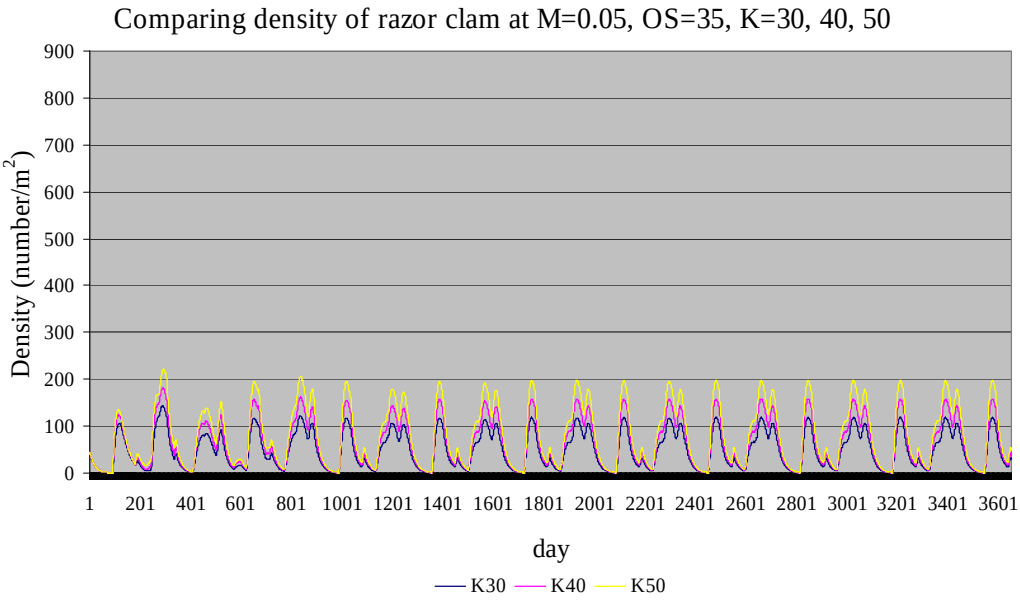
Comparing density of razor clam at M=0.04, OS=35, K=30, 40, 50

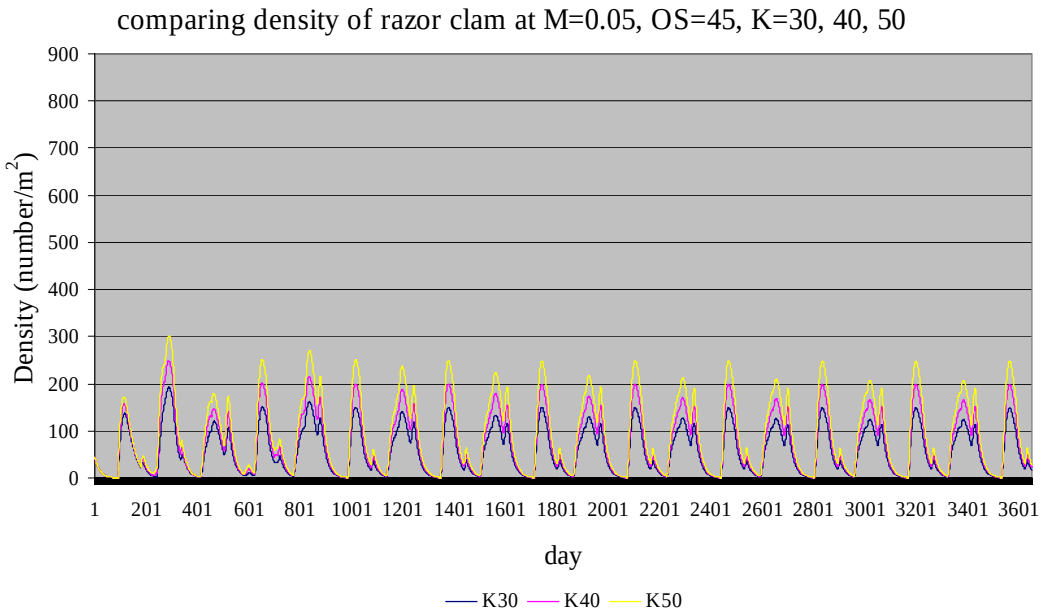


Comparing density of razor clam at M=0.04, OS=45, K=30, 40, 50

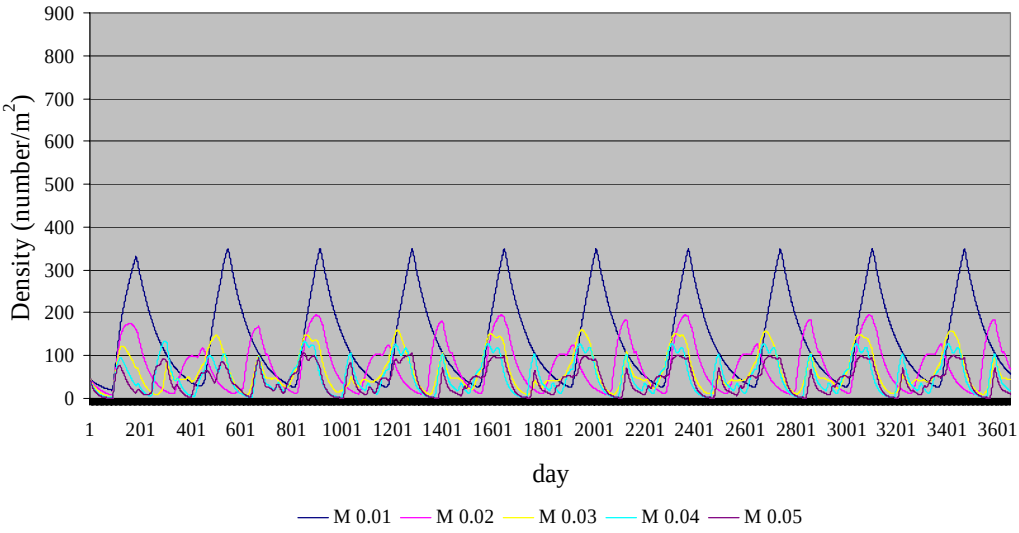



Comparing density of razor clam at M=0.05, OS=25, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50

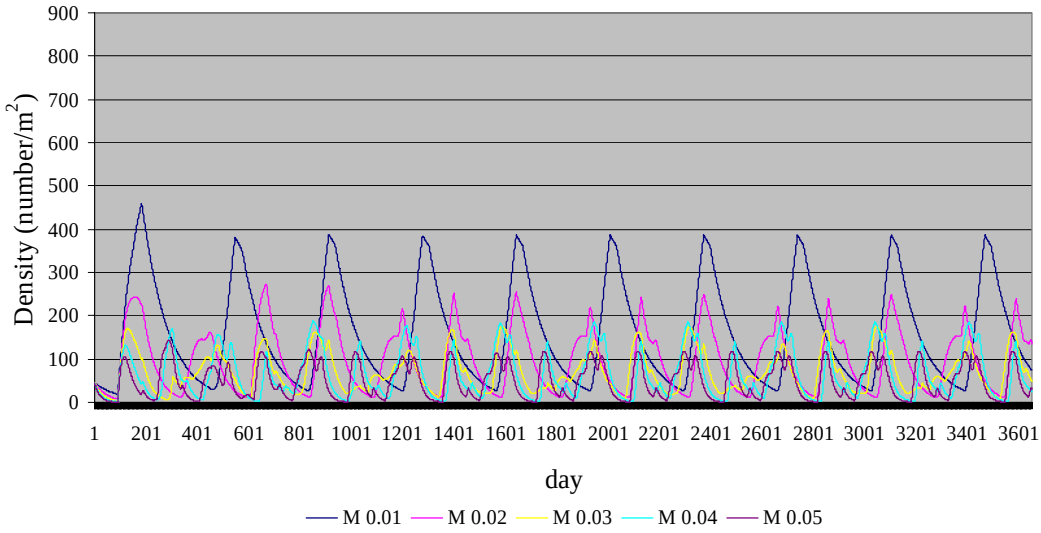

Comparing density of razor clam at M=0.05, OS=35, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50


comparing density of razor clam at M=0.05, OS=45, K=30, 40, 50
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
K30 K40 K50

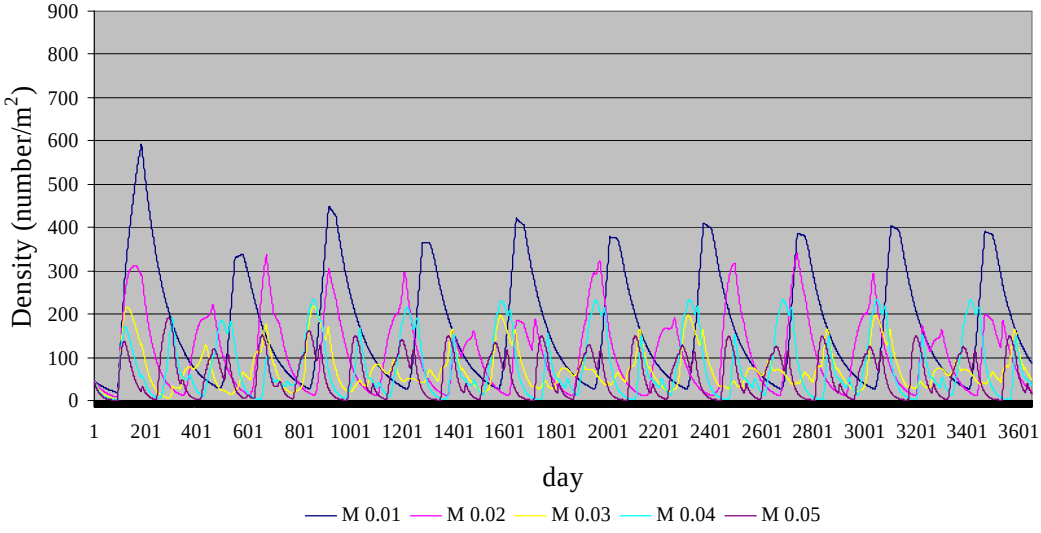
Comparing density of razor clam at K=30 OS=25
M=0.01,0.02,0.03,0.04,0.05

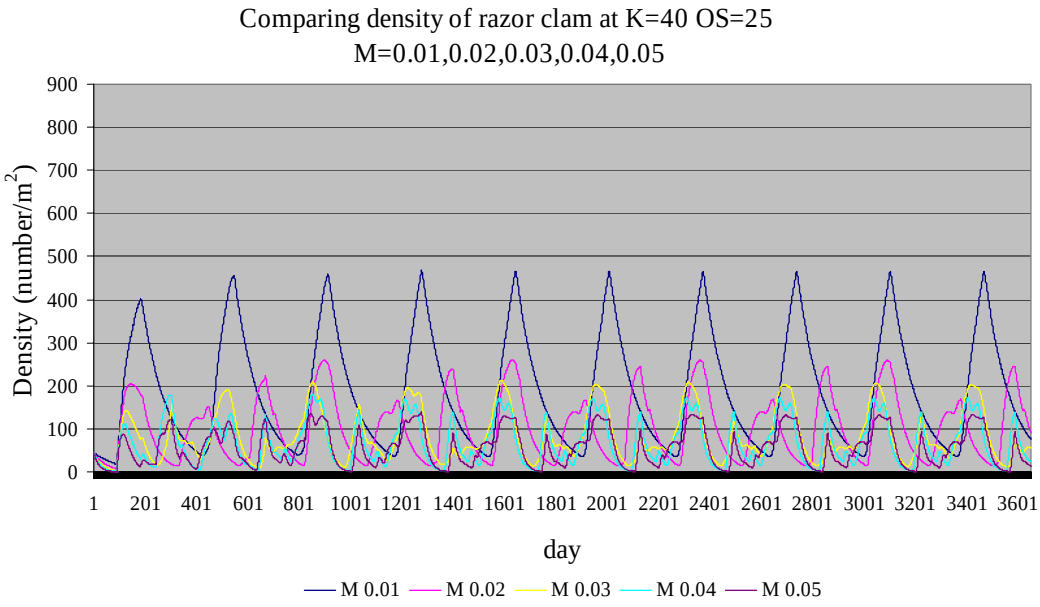


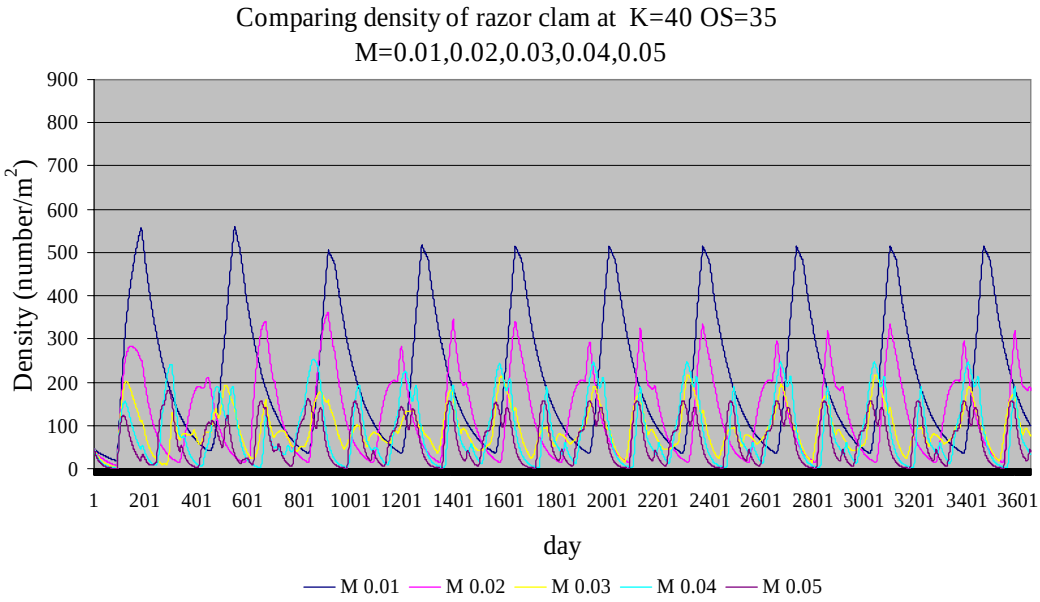
Comparing density of razor clam at K=30 OS=35
M=0.01,0.02,0.03,0.04,0.05

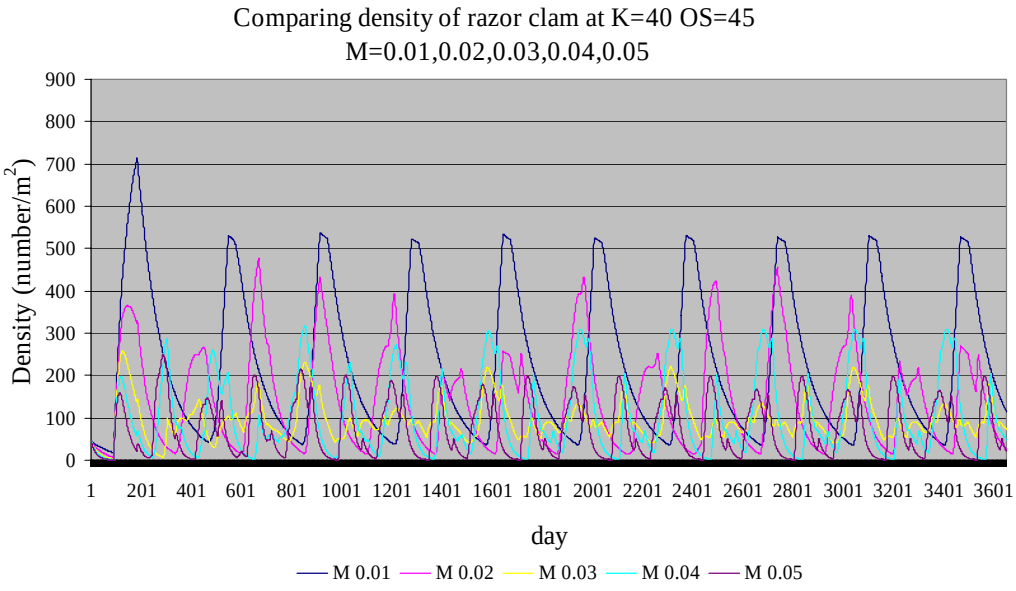


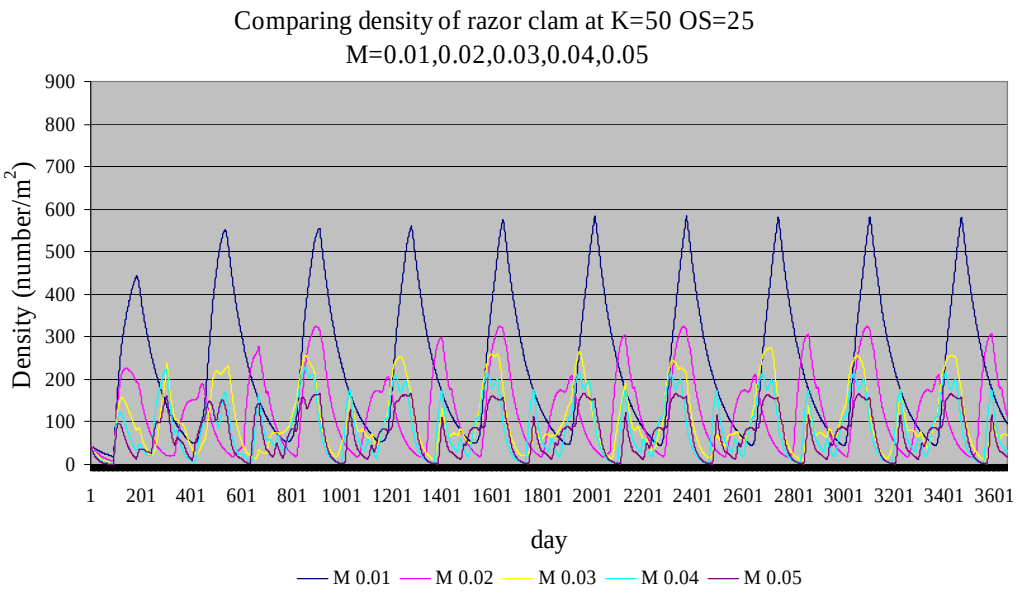
Comparing density of razor clam at K=30 OS=45
M=0.01,0.02,0.03,0.04,0.05

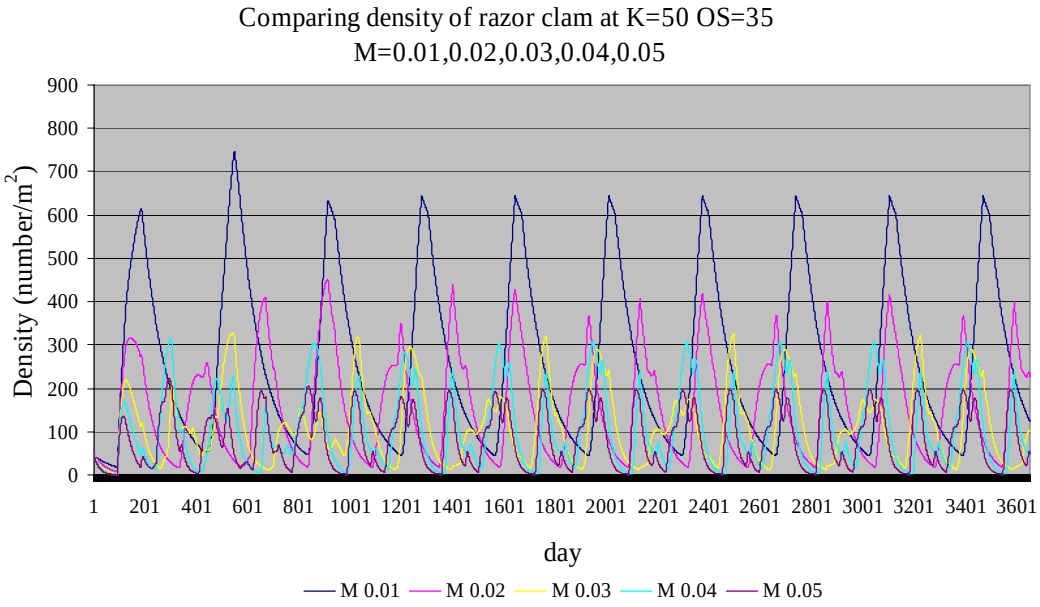


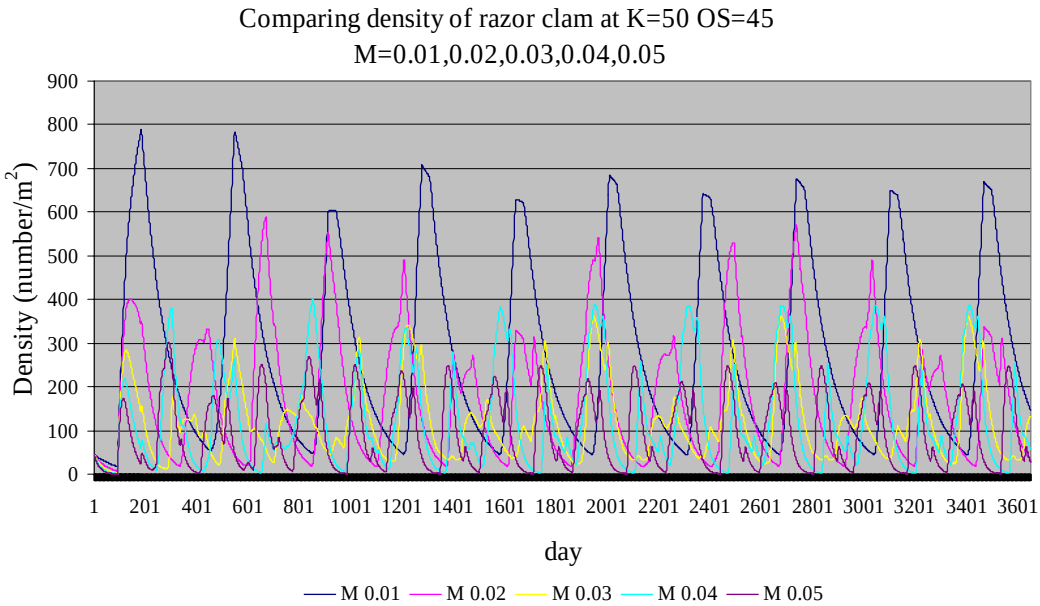

Comparing density of razor clam at K=40 OS=25
M=0.01,0.02,0.03,0.04,0.05
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
M 0.01 M 0.02 M 0.03 M 0.04 M 0.05


Comparing density of razor clam at K=40 OS=35
M=0.01,0.02,0.03,0.04,0.05
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
M 0.01 M 0.02 M 0.03 M 0.04 M 0.05

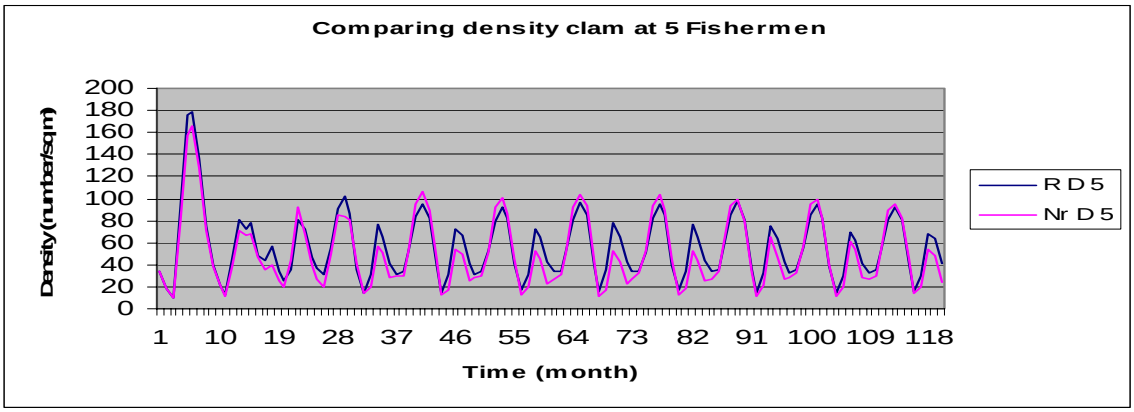

Comparing density of razor clam at K=40 OS=45
M=0.01,0.02,0.03,0.04,0.05
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
M 0.01 M 0.02 M 0.03 M 0.04 M 0.05


Comparing density of razor clam at K=50 OS=25
M=0.01,0.02,0.03,0.04,0.05
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
M 0.01 M 0.02 M 0.03 M 0.04 M 0.05


Comparing density of razor clam at K=50 OS=35
M=0.01,0.02,0.03,0.04,0.05
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
M 0.01 M 0.02 M 0.03 M 0.04 M 0.05

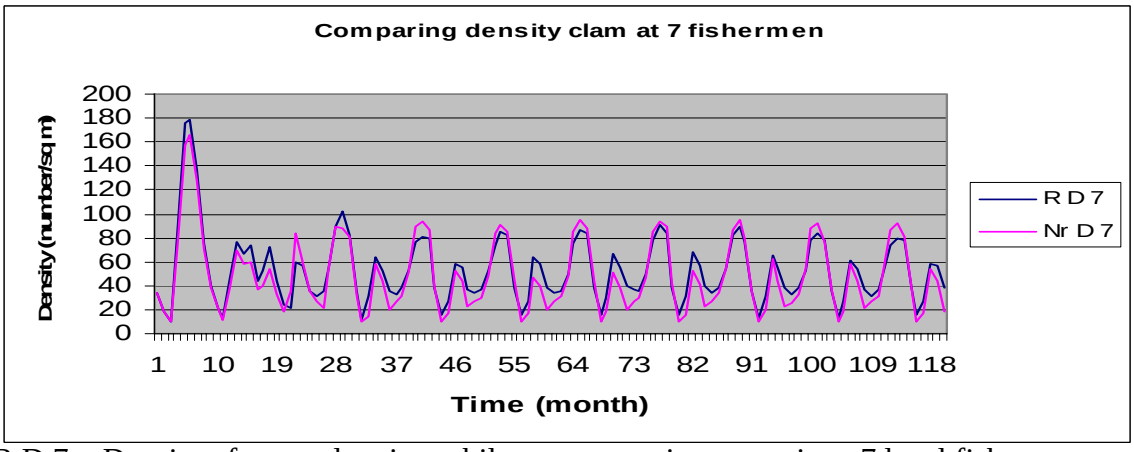

Comparing density of razor clam at K=50 OS=45
M=0.01,0.02,0.03,0.04,0.05
Density (number/m2)
900
800
700
600
500
400
300
200
100
0
1 201 401 601 801 1001 1201 1401 1601 1801 2001 2201 2401 2601 2801 3001 3201 3401 3601
day
M 0.01 M 0.02 M 0.03 M 0.04 M 0.05

D 2 Simulation run both of two scenarios



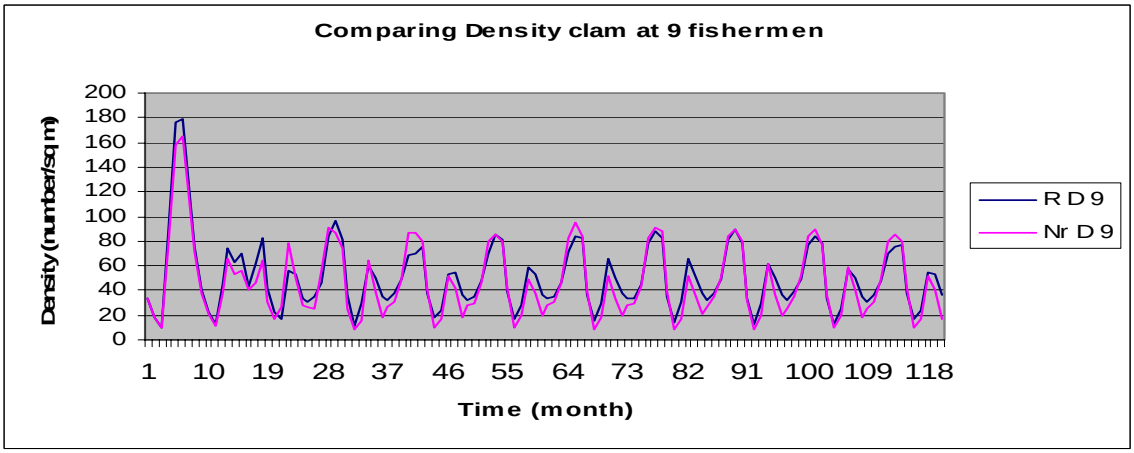
R D 5 = Density of razor clam in mobile reserve zoning scenario at 5 local fisherman

Nr D 5 = Density of razor clam in non-mobile zoning scenario at 5 local fisherman



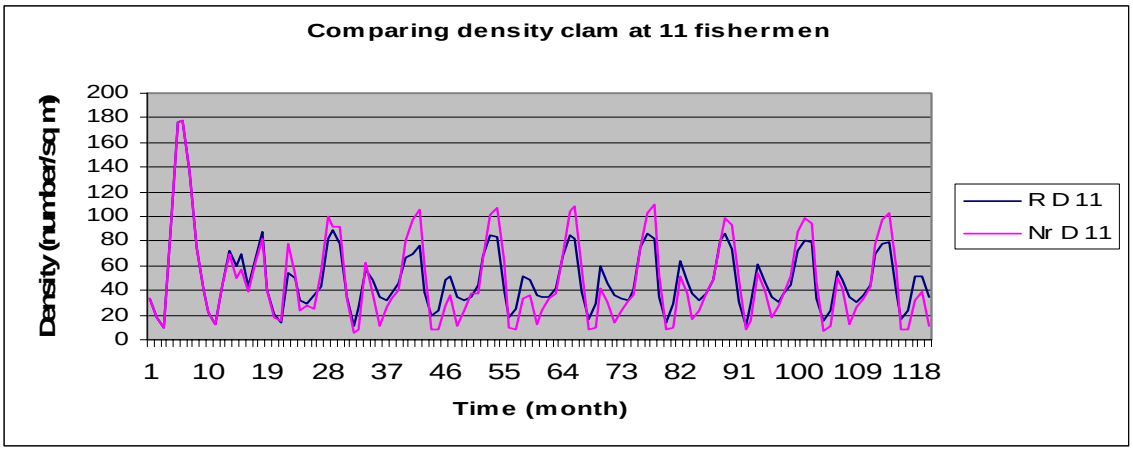
R D 7 = Density of razor clam in mobile reserve zoning scenario at 7 local fisherman

Nr D 7 = Density of razor clam in non-mobile zoning scenario at 7 local fisherman



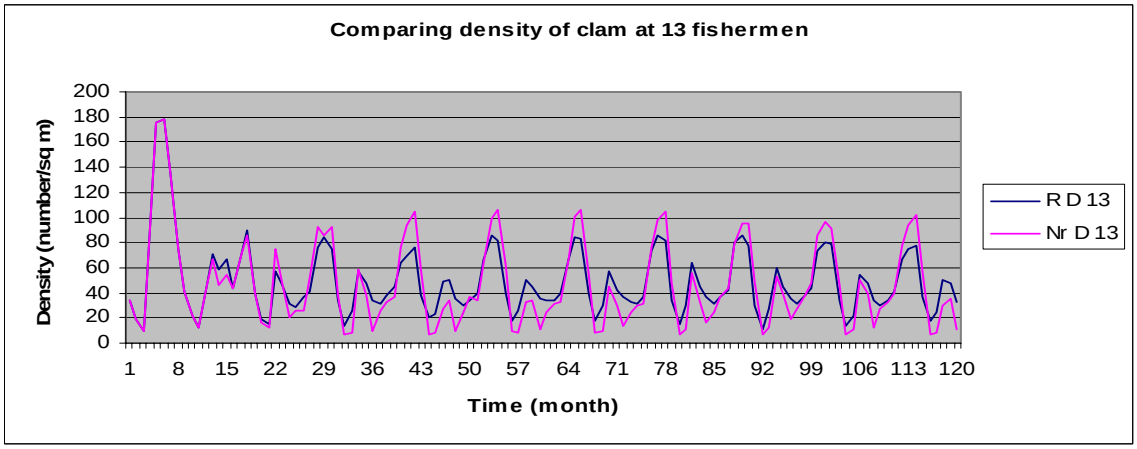
R D 9 = Density of razor clam in mobile reserve zoning scenario at 9 local fisherman

Nr D 9 = Density of razor clam in non-mobile zoning scenario at 9 local fisherman



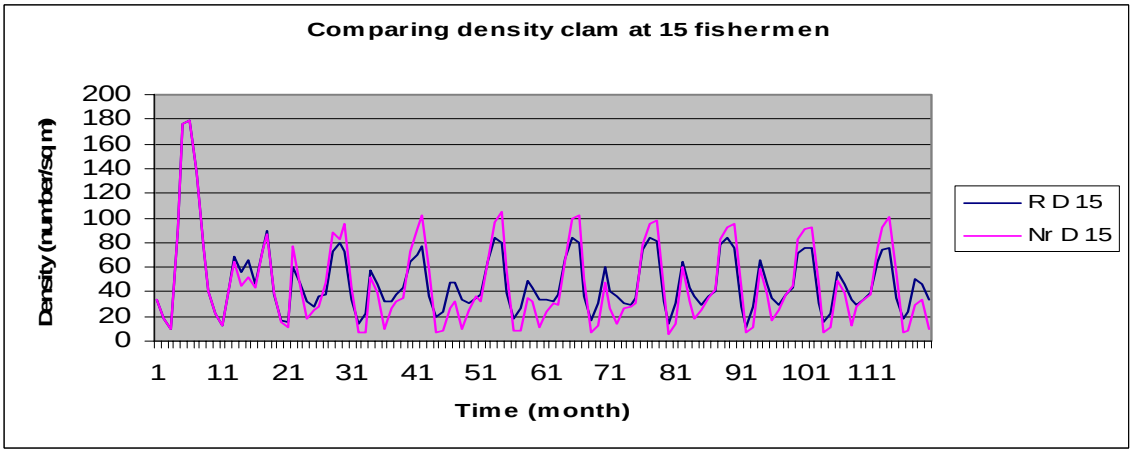
R D 11 = Density of razor clam in mobile reserve zoning scenario at 11 local fisherman

Nr D 11 = Density of razor clam in non-mobile zoning scenario at 11 local fisherman



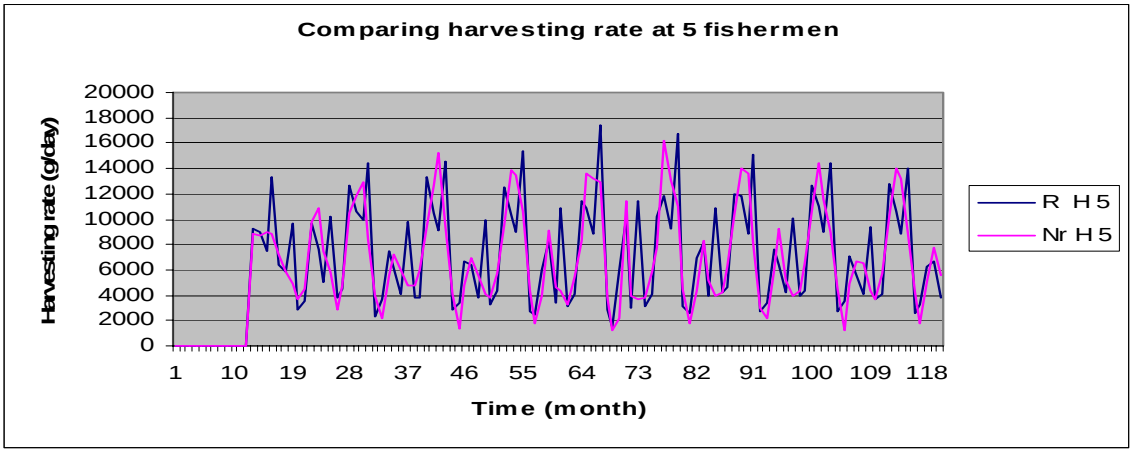
R D 13 = Density of razor clam in mobile reserve zoning scenario at 13 local fisherman

Nr D 13 = Density of razor clam in non-mobile zoning scenario at 13 local fisherman



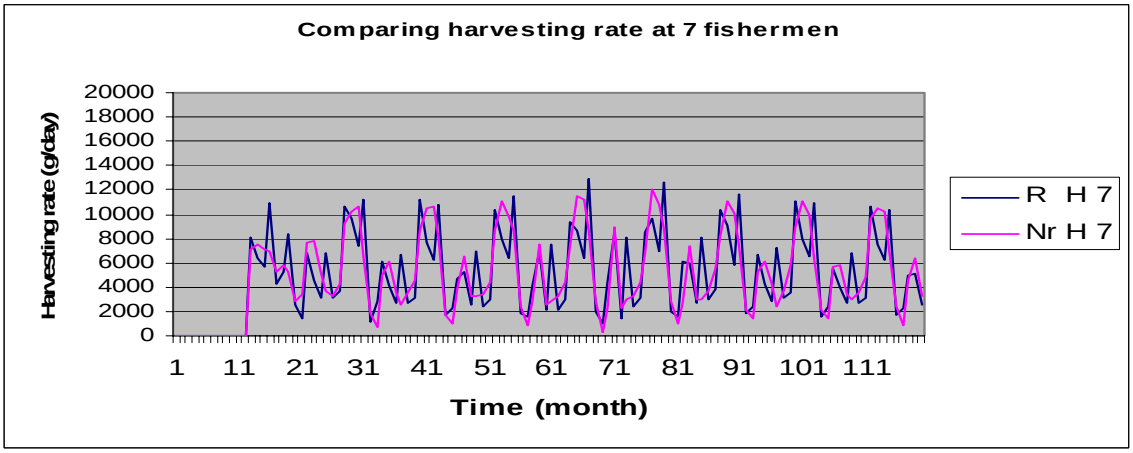
R D 15 = Density of razor clam in mobile reserve zoning scenario at 15 local fisherman

Nr D 15 = Density of razor clam in non-mobile zoning scenario at 15 local fisherman



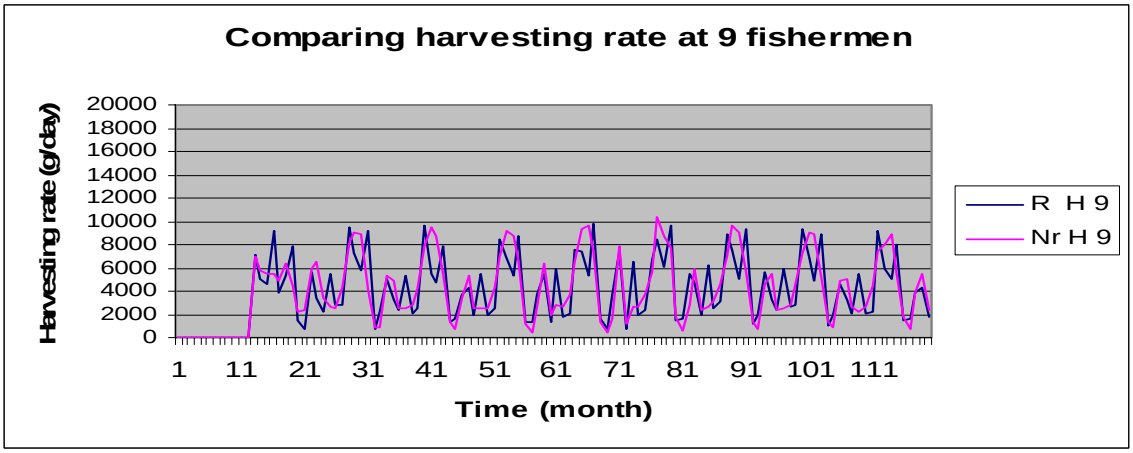
R H 5 = Harvesting rate of local fisherman in mobile at 5 fishermen

Nr H 5 = Harvesting rate of local fisherman in non-mobile at 5 fishermen



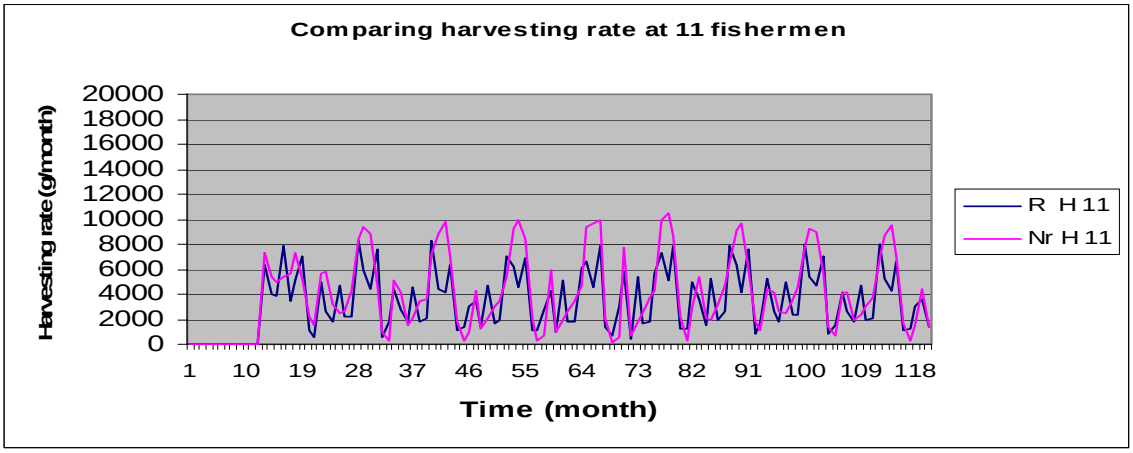
R H 7 = Harvesting rate of local fisherman in mobile at 7 fishermen

Nr H 7 = Harvesting rate of local fisherman in non-mobile at 7 fishermen



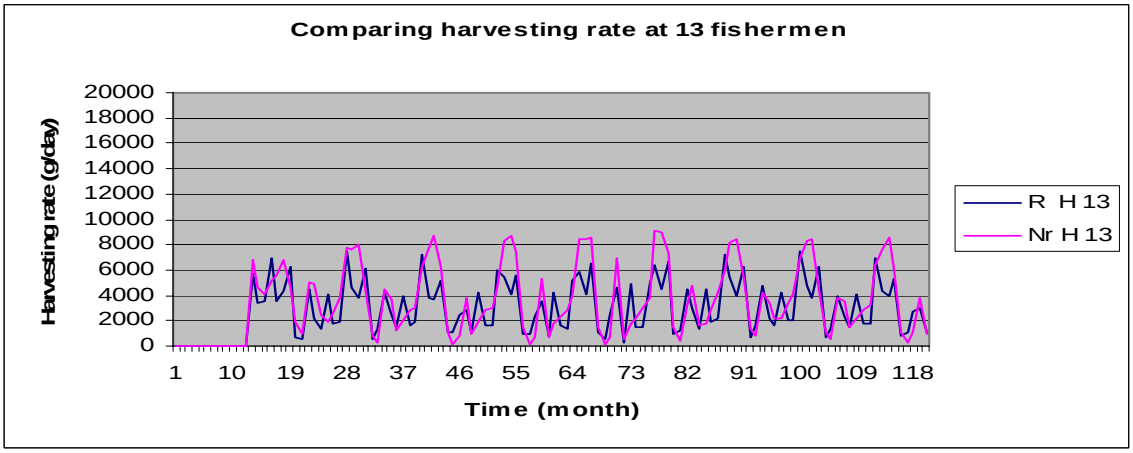
R H 9 = Harvesting rate of local fisherman in mobile at 9 fishermen

Nr H 9 = Harvesting rate of local fisherman in non-mobile at 9 fishermen



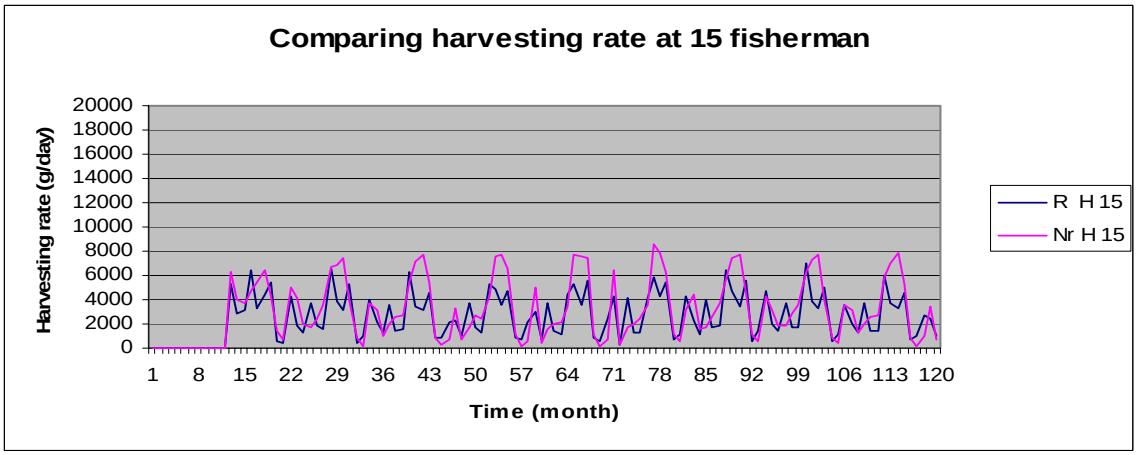
R H 11 = Harvesting rate of local fisherman in mobile at 11 fishermen

Nr H 11 = Harvesting rate of local fisherman in non-mobile at 11 fishermen



R H 13 = Harvesting rate of local fisherman in mobile at 13 fishermen

Nr H 13 = Harvesting rate of local fisherman in non-mobile at 13 fishermen



R H 15 = Harvesting rate of local fisherman in mobile at 15 fishermen

Nr H 15 = Harvesting rate of local fisherman in non-mobile at 15 fishermen

APPENDIX E

Voice and Video clip discussion during RPG session
