USE OF PASSIVE INTEGRATED TRANSPONDER (PIT) SYSTEM AS A METHOD TO TAG JUVENILES OF GREATER AMBERJACK (*SERIOLA DUMERILI*) IN GROW OUT STUDIES

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S. Jerez, J.R. Cejas, M.V. Martín, E. Almansa, F.J. Santamaría.

Spanish Institute of Oceanography. Canarias Oceanographic Centre.
Vía Espaldón, Dársena Pesquera, Parcela nº 8, 38180 Santa Cruz de Tenerife. Spain
(salvador.jerez@ca.ieo.es)

INTRODUCTION

The greater amberjack (*Seriola dumerili*) is a potential species in the aquaculture diversification. Although the fry production at industrial scale is limited, some breeding, larval culture and grow out results have been achieved.

The grow out of *S. dumerili*, like in other cultured species, represents the longest and more expensive production phase. Moreover, the effects of feeding strategies and management on growth patterns and size dispersal are not well known in spite of its importance in the production costs.

The use of techniques for identification of individual fish is turning out to be indispensable for obtaining precise data. Individual tagging could improved the knowledge of growth patterns and behavior because allows getting a greater volume of information and more reliable.

The use of external systems for tagging fish has the advantages of being economical and easy to apply. However, they have the potential disadvantages of affecting growth, health and survival. On the contrary, internal systems, such as the Passive Integrated Transponders (PIT), appear to have little or no effect on fish growth and survival.

Tagging systems need to be tested for each species because of differences in susceptibility to manipulation, size, growth rate and morphology. Thus, several studies have been carried out on different species of salmonids, perches, tilapias and sparids (Quartararo and Bell, 1992; Bruyndoncx et al., 2002; Navarro et al., 2006).

Until present there are no reports concerning tagging of greater amberjack. Thus, this study was conducted to examine the utility of Passive Integrated Transponder (PIT) tagging system in juveniles of greater amberjack. Tag effect on growth, condition factor and mortality rate as well as PIT tag loss rate was determined in fish cultured. In the same experiments the effects of different feeding strategies (by varying frequency and ration) were tested.

MATERIAL AND METHODS

- All fish were anaesthetized with chlorobutanol (200 mg/L) prior to tagging with Passive Integrated Transponders (PIT; Datamars, CH).
- PIT tags (0.096±0.0007 g and 2.05×11 mm) were introduced in dorsal muscle of fish and PIT codes were detected by ISO MAX V reader (Datamars, CH).
- 216 fish (128.2 ± 38.7 g) were randomly assigned to 12 tanks (1 m^3): 8 PIT tag fish and 10 untagged fish per tank with initial density of 2.34±0.28 kg/m^3.
- During 48 days fish were fed daily with fish pellets according to different feeding strategies: Frequency (1, 2 or 3 times day) and Ration (1.5, 2.5, 3.0 and 4.0 % biomass day).
- Weight and length were measured at days 0, 14, 28 and 49
- Condition factor (CF= 100 x Weight (g) x Length^{-1} (cm^3)) and Specific growth rates (SGR (% day^{-1}) = 100 x (Ln Weight final (g)-Ln Weight initial (g))x days^{-1}) were estimated at each sampling period.
- Mortality of each tank was recorded daily and PIT loss rates were recorded at each sampling period.

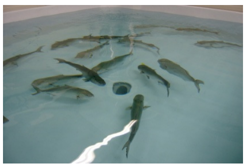
RESULTS

- There was not PIT loss in tagged fish. Mortality rates were very low being 6.25 % and 5.83 % for PIT tagged and untagged fish, respectively. Mortality occurred during the last period of the experiment (28-49 days) and no differences were found between tagged and untagged fish.
- Mean weights and condition factor of PIT tagged and untagged fish of each experimental tank were similar during experimental period (48 days) (p>0.05), so no effect of PIT was found on growth.

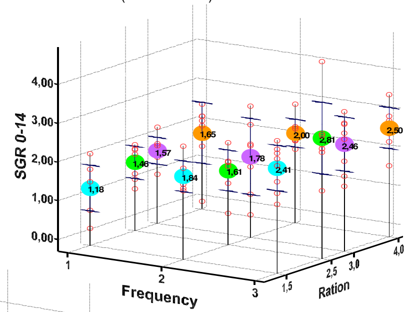
Weight and Condition Factor (CF) (mean ± standard deviation) of Pit tagged and untagged juveniles of *S. dumerili* stocked in each tank and fed with different frequency (F) and ration level (R) at 14, 28 and 49 days.

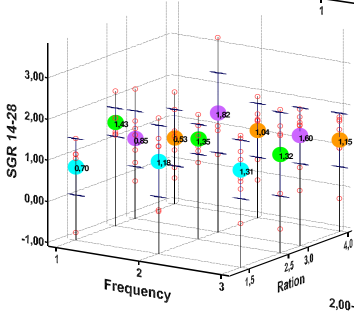
F	R		Weight 14	Weight 28	Weight 49	CF 14	CF 28	CF 49
1	1.5	untagged	185.9 ± 20.8	203.7 ± 22.9	240.0 ± 27.4	1.95 ± 0.11	1.88 ± 0.11	1.84 ± 0.15
		tagged	146.1 ± 53.8	162.5 ± 63.3	188.1 ± 85.9	1.96 ± 0.12	1.86 ± 0.12	1.90 ± 0.15
	2.5	untagged	145.6 ± 35.8	236.0 ± 78.3	271.0 ± 109.9	2.04 ± 0.13	2.03 ± 0.15	1.92 ± 0.15
		tagged	132.6 ± 18.8	197.9 ± 21.2	221.5 ± 31.0	1.96 ± 0.08	2.06 ± 0.19	1.87 ± 0.14
	3.0	untagged	191.3 ± 57.9	206.9 ± 69.0	184.9 ± 76.6	1.98 ± 0.13	1.92 ± 0.15	1.64 ± 0.18
		tagged	144.1 ± 51.8	164.8 ± 64.8	178.3 ± 74.9	2.00 ± 0.26	1.97 ± 0.27	1.76 ± 0.32
	4.0	untagged	187.5 ± 52.7	211.0 ± 60.1	224.4 ± 89.9	2.00 ± 0.07	1.93 ± 0.12	1.86 ± 0.22
		tagged	149.6 ± 41.9	163.5 ± 54.0	168.9 ± 69.5	1.97 ± 0.14	1.91 ± 0.15	1.73 ± 0.20
2	1.5	untagged	195.7 ± 44.9	239.3 ± 61.8	271.2 ± 75.4	2.03 ± 0.12	1.97 ± 0.15	1.94 ± 0.19
		tagged	159.4 ± 44.0	190.0 ± 58.6	216.0 ± 74.4	1.93 ± 0.07	1.87 ± 0.08	1.82 ± 0.14
	2.5	untagged	142.9 ± 65.4	177.6 ± 91.2	215.7 ± 111.9	1.96 ± 0.28	1.98 ± 0.37	1.92 ± 0.38
		tagged	168.3 ± 44.3	202.6 ± 51.2	232.0 ± 63.9	2.08 ± 0.14	2.11 ± 0.18	2.06 ± 0.19
	3.0	untagged	173.5 ± 42.5	224.8 ± 51.4	241.6 ± 62.2	2.03 ± 0.23	2.15 ± 0.24	2.02 ± 0.13
		tagged	162.4 ± 49.2	189.0 ± 48.2	244.0 ± 63.2	2.00 ± 0.16	2.02 ± 0.20	1.94 ± 0.14
	4.0	untagged	172.8 ± 39.1	196.0 ± 48.3	204.1 ± 60.6	1.95 ± 0.10	1.90 ± 0.13	1.76 ± 0.19
		tagged	172.0 ± 45.9	200.8 ± 59.0	207.9 ± 75.4	2.11 ± 0.30	2.04 ± 0.24	1.87 ± 0.21
3	1.5	untagged	152.7 ± 38.0	179.2 ± 50.9	215.6 ± 76.7	1.98 ± 0.05	1.88 ± 0.19	1.83 ± 0.28
		tagged	154.5 ± 40.6	186.1 ± 52.7	218.6 ± 69.7	2.03 ± 0.11	1.91 ± 0.22	1.86 ± 0.24
	2.5	untagged	170.8 ± 45.0	218.3 ± 64.5	231.4 ± 89.5	2.08 ± 0.09	2.09 ± 0.15	1.84 ± 0.14
		tagged	147.3 ± 57.4	198.6 ± 77.4	228.3 ± 127.4	2.09 ± 0.12	2.08 ± 0.23	1.92 ± 0.33
	3.0	untagged	144.2 ± 40.7	189.1 ± 65.1	213.3 ± 103.5	2.02 ± 0.09	1.92 ± 0.19	1.81 ± 0.20
		tagged	154.4 ± 52.4	196.8 ± 74.5	261.0 ± 107.7	2.01 ± 0.11	1.97 ± 0.18	1.91 ± 0.22
	4.0	untagged	139.0 ± 25.6	155.2 ± 31.4	178.0 ± 49.9	2.01 ± 0.13	1.87 ± 0.12	1.83 ± 0.16
		tagged	175.1 ± 59.6	209.3 ± 82.1	211.6 ± 84.1	2.08 ± 0.26	1.94 ± 0.11	1.84 ± 0.18

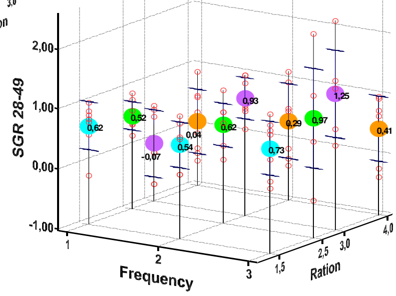
Results represent means ± SD of tagged (n=8) and untagged (n=10) juveniles. p>0.05 untagged compared to tagged



- SGR of PIT tagged and untagged fish feeding 3 times day showed higher growth rates (p<0.05) compared with fish feeding 1 times day in the whole rearing period (1.40±0.44 vs 0.80±0.38 %).
- There was no significant influences of the ration factor in the growth rate except for the period of 28-49 days being the lowest value obtain with a ration of 4% (0.24±0.56 %).







Specific growth rate (SGR (% day^{-1}) of PIT tag juveniles of *S. dumerili* stocked in each tank and fed with three different frequency (F) and ration level (R) at 0-14, 14-28 and 28-49 days periods. Open red circles show individual SGR, solid circles show mean SGR value of each tank fed at frequency of 1, 2 and 3 times/day at 1.5 (blue), 2.5 (green), 3.0 (violet) and 4.0 (orange) rations.

CONCLUSIONS

The use of PIT tag allows the acquisition of more and improved information to a better understand of the growth patterns and social interactions of fish with a reduction of the number of fish according the principles of animal experimentation and increasing the accuracy of growth parameters estimation. Moreover they can be an important tool to the study and monitoring of diseases and also for genetic breeding programs.

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