Effect Of Feeds And Type Of Pond On The Overall Development On Fish Farming: A Case Study Of Catfish

Olawale A.O

Department of Statistics, Federal Polytechnic, Ile-Oluji, Ondo State
oludayobola@gmail.com

Abstract: Farming as a business is gaining more attention from Government as well as private establishment. The role of fish farming in the entire global development can not be underestimated. As part of vision 20:20:20, Federal Government is taking every predictable step to back her economic development. It was based on this that this research was coined out in other to actually know the effect of three different feeds i.e. copen, vital and local feeds the types of ponds constructed for catfish production. The data used was a primary data collected over a span of some months, the records obtained eventually gave room to the use of complete randomized design and t-test having satisfied all the assumptions and we discover that the three feeds have effects on the weight of catfish while types of pond and interaction between the two independent factors have no significant effect. It was further revealed through multiple comparisons that only copen and local feeds have significant effects on the weight of catfish. T-test analysis made us to realize that the average weight of catfish in both ponds are the same.

Keyword: ANOVA, CRBD, t-test, sample, fish, pond, concrete, earthen, feed.

Introduction

A fish is a vertebrate, meaning that it possesses a backbone. It is cold blooded, meaning that it does not have a consistent body temperature such as human being, for the temperature rises and falls in accordance with that of the surrounding water. In general, fishes are ideally equipped for the aquatic existence to which most are completely confined. Fish farming is one of the branches in agricultural sciences which serve as a source of income to the people when they invest in it. It is also a process by which a fish is bred for human consumption.

Moreover, to make the business grows or make the fishes yield high level of profit, we must study the effect which the construction of ponds will have over the weight of fishes and the effect that the feed given to them will also have the weight. This research enables us to verify which of the ponds (concrete and earthen) will have high effect on the weight of the fishes when feeding them with different feeds.

Methodology

Three outdoor concrete and three earthen ponds located at the fish farm of federal fishery farm, Ado-Ekiti, Ekiti State were used for the experiment. Each pond measured 10m by 20m length, 8ft height and 12m by 24m length, 3ft height for both ponds respectively and have provision for water (water passed) inlet and drainage. During the experiment three (3) different feeds were given to the fishes in both ponds at the same time everyday for the duration of 3 months which the experiment was conducted. A random selection of twenty (20) fishes on coppen, vital and local feeds was selected for the research.

Analysis of Variance

Analysis of Variance is purposely used to test the significant difference between three or more sampling means of equivalence to test the null hypothesis that the sample mean are equal. It is classified into one-way or one factor experiment and two-way or two factors experiment. For the purpose of this research work, complete randomized block design will be employed due to the involvement of two independent variables (types of pond and feeds).

The model

$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + e_{ijk}$;

$i = 1, 2\ldots p, j = I, 2\ldots q, k = 1,2...n$

where Y_{ijk} is the development (weight) of kth fish in j^{th} pond using i^{th} feed.

μ is the overall mean

α_i is the effect of ith feed on k^{th} catfish

β_j is the effect of jth pond on k^{th} catfish

$(\alpha\beta)_{ij}$ is the interaction effect of both i^{th} feed on and j^{th} on k^{th} catfish and e_{ijk} is the random error term.

T – test Statistic.

It is a device to take care of small sample cases in order to hypothesise about the different between means when the sample size is small i.e. $n < 30$.

$$/t/ = \frac{\overline{X_1} - \overline{X_2}}{SP\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$\overline{X}$ = sample mean.   n = Sample size (number of observations).
SP = the square root of the pooled variance i.e.
S.D

Table 1: Weight of fishes in kilogram in concrete and earthen ponds with three different feeds

CONCRETE POND					EARTHEN POND				
S/N	Coppens Feed	Vital Feed	Local Feed	Total	S/N	Coppens Feed	Vital Feed	Local Feed	Total
1.	0.5	0.4	0.3	1.2	1	0.56	0.31	0.35	1.2
2	0.4	0.38	0.38	1.2	2	0.52	0.4	0.3	1.2
3	0.3	0.25	0.37	0.9	3	0.45	0.41	0.45	1.3
4	0.32	0.45	0.48	1.3	4	0.62	0.35	0.48	1.5
5	0.45	0.5	0.52	1.5	5	0.6	0.38	0.51	1.5
6	0.5	0.43	0.34	1.3	6	0.58	0.45	0.3	1.3
7	0.55	0.35	0.23	1.1	7	0.67	0.5	0.41	1.6
8	0.38	0.3	0.42	1.1	8	0.71	0.37	0.32	1.4
9	0.6	0.32	0.47	1.4	9	0.51	0.49	0.5	1.5
10	0.6	0.4	0.25	1.3	10	0.35	0.52	0.38	1.3
11.	0.92	0.75	0.6	2.3	11	0.6	0.6	0.55	1.8
12	0.85	0.6	0.45	1.9	12	0.65	0.7	0.57	1.9
13	0.7	0.85	0.5	2.1	13	0.5	0.65	0.6	1.8
14	0.8	0.7	0.63	2.1	14	0.7	0.72	0.77	2.2
15	0.85	0.88	0.75	2.5	15	0.52	0.55	0.8	1.9
16	0.68	0.91	0.53	2.1	1.6	0.4	0.9	0.67	2.2
17	0.57	0.62	0.6	1.	17	0.8	0.72	0.65	2.0
18	1	0.72	0.8	2.5	18	0.62	0.65	0.72	2.0
19	0.51	0.51	0.75	1.8	19	0.6	0.7	0.5	1.8
20	1.5	0.63	0.64	2.8	20	1.8	0.68	0.58	2.3
Total	12.98	10.95	10.01	33.9		11.96	11.05	10.41	33.46
Grand Total									67.36

Hypothesis Statement 1
H_o: There is no significant difference in the effect of feeds used on the weight of catfish.
H_i: There is significant difference in the effect of feeds used on the weight of catfish.

Hypothesis Statement 2
H_o: There is no significant difference in the effect of types of pond on the weight of catfish.
H_i: There is significant difference in the effect of types of pond on the weight of catfish.

Hypothesis Statement 3
H_o: There is no significant difference in the effect of interaction on the weight of catfish.
H_i: There is significant difference in the effect of interaction on the weight of catfish.

The data was analyzed using SPSS version 17 and the results are contained in the table below:

Table 2: The average mean of weight of fishes in both concrete and earthen ponds

CONCRETE POND				EARTHEN PONDS				
S/N	Coppens Feed	Vital Feed	Local Feed	Avrg. Mean X_c	S/N	Coppens Feed	Vital Feed	Local Feed	Avrg. Mean X_c
1.	0.5	0.4	0.3	0.4	1	0.56	0.31	0.35	1.22
2	0.4	0.38	0.38	0.4	2	0.52	0.4	0.3	0.41
3	0.3	0.25	0.37	0.3	3	0.45	0.41	0.45	0.44
4	0.32	0.45	0.48	0.4	4	0.62	0.35	0.48	0.48
5	0.45	0.5	0.52	0.5	5	0.6	0.38	0.51	0.50
6	0.5	0.43	0.34	0.4	6	0.58	0.45	0.3	0.44
7	0.55	0.35	0.23	0.4	7	0.67	0.5	0.41	0.53
8	0.38	0.3	0.42	0.4	8	0.71	0.37	0.32	0.47
9	0.6	0.32	0.47	0.5	9	0.51	0.49	0.5	0.50
10	0.6	0.4	0.25	0.4	10	0.35	0.52	0.38	0.42
11.	0.92	0.75	0.6	0.8	11	0.6	0.6	0.55	0.58
12	0.85	0.6	0.45	0.6	12	0.65	0.7	0.57	0.64
13	0.7	0.85	0.5	0.7	13	0.5	0.65	0.6	0.58
14	0.8	0.7	0.63	0.7	14	0.7	0.72	0.77	0.73
15	0.85	0.88	0.75	0.8	15	0.52	0.55	0.8	0.62
16	0.68	0.91	0.53	0.7	1.6	0.4	0.9	0.67	0.66
17	0.57	0.62	0.6	0.6	17	0.8	0.72	0.67	0.73
18	1	0.72	0.8	0.8	18	0.62	0.65	0.72	0.66
19	0.51	0.51	0.75	0.6	19	0.6	0.7	0.5	0.60
20	1.5	0.63	0.64	0.9	20	1	0.68	0.58	0.75
Total				11.33	Total				11.96

Comparison Of Weights Of Fishes In The Ponds Using T-Test
Hypothesis Statement 4
H_o: There is no significant difference in the mean weight of catfish in both concrete and earthen ponds
H_i: There is significant difference in the mean weight of catfish in both concrete and earthen ponds

The data was analysed using SPSS version 17 and the results shows that there is no sufficient evidence to reject the null hypothesis which invariably means that there is no significant difference in the mean weight of catfish in both concrete and earthen ponds.

Conclusion.
Based on the results obtained using SPSS version 17, it was observed that only local and copen feeds have significant effect on the weight of catfish while the interaction between types of pond and feeds have no effect on the weight of catfish, hence, it is recommended that either of local or copen feed can be used by fish farmers in feeding their catfish. Also, any of the ponds can be used to rear catfish.

Government at every level is advised to organize sensitizing programme through their agencies to sensitize and encourage fish farmers in Nigeria.

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