Analysis of factors influencing consumers' preference for aquarium keeping

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ABSTRACT

This study investigates the factors that influence consumers' preference for aquarium keeping. Primary data were collected from consumers (ornamental fish hobbyists) using well-structured and pre-tested interview schedule. Results indicated that community aquarium was preferred by majority of the consumers followed by single species, planted and marine aquaria. The wooden/steel aquarium stand was mostly preferred compared to cabinet and aquarium kept in shelves/showcase. Majority of the consumers preferred medium size followed by small and large size tanks. On a whole consumers preferred medium size wooden/steel aquarium with community of species.

Keywords: Ornamental fish; aquarium; consumers' preference; hobby

INTRODUCTION

Ornamental fish keeping is a popular hobby in developed countries and is gaining popularity in many developing countries. The increasing popularity of ornamental fishes has a positive effect on the aquarium fish trade globally (Selvarasu and Sankaran 2010). Ornamental fish market linkage exists between buyers and sellers as well as domestic and international markets (Mahapatra et al 2007). Aquarium fish business is becoming very popular throughout the world due to its easy operating system and less operating costs. In the major markets for ornamental fish, the retail value is many times that of its trade value with a positive impact throughout the value chain (Monticini 2010). The ornamental fish industry is expected to grow by 8 per cent with the increasing demand for ornamental fishes (Raja et al 2019).

There are different growing businesses related to hobby in maintaining aquarium in the institutional offices and also at the household (Selvarasu and Sankaran 2010). Although majority of researchers have focused on the biological characteristics like feeding, breeding and genetics of ornamental fishes (Chitra and Krishnaveni 2013, Arul Joshpin and Meena 2015, Kaur and Shah 2017) there is an urgent need to study trade and consumers' preference for ornamental fish keeping. Considering the importance of this emerging sector, this study attempts to analyse the factors that influence the consumers' preference for aquarium keeping.

METHODOLOGY

The research work was carried out in Chennai, the metropolis capital city of Tamil Nadu for its industrial, commercial, cultural, economic and educational prominence. Major portion of ornamental fish export from India is done from Kolkata followed by Mumbai and Chennai. In Chennai, Kolathur is well known for ornamental fish production as cottage industry. Considering these production and consumption factors, Chennai was chosen as the study area.

The target population for this study was aquarium owners. A multistage random sampling was done for the selection of respondents. In the first stage, five zones of Chennai corporation; in the second stage, three wards from each selected zone; in the third stage, one aquarium retail outlet from each selected ward and in the fourth stage, 10 consumers visiting these shops were selected through random sampling thus making a total sample size of 150 respondents comprising 30 from each of the chosen zones.

The data were collected using well-structured and pre-tested interview schedule through sample survey. The data were analysed through conventional, tabular and functional methods and were subjected to chi-square test.

RESULTS and DISCUSSION

Type of aquarium

Consumers' preference for different types of aquarium tank is presented in Table 1.

Among the male respondents, the preference was highest for community aquarium (53.15%) followed by single species (34.27%), planted (10.48%) and marine (2.10%) aquaria. Among the females preference for community aquarium was 71.42 per cent and 14.29 per cent each for single species and marine aquaria. The more preference for community aquarium was common due to its easiness in maintenance unlike planted or marine aquaria. The cost of ornamental fishes suitable for community aquarium was less compared to other types of aquaria. The single species was next in preference because they are easy to care although the cost of fish is higher as compared to other varieties of fishes.

The young respondents under 18 years of age mostly preferred community aquarium (66.67%) followed by single species (30.00%) and planted (3.33%) aquaria. Same was the order of preferences for type of aquaria among middle and adult age groups although marine aquaria were owned by the aged groups.

It was revealed that the beginners who had less than one year of experience, mostly preferred community aquarium (58.33%) followed by single species (33.33%) and planted (8.33%) aquaria. It was learnt that the beginners started with community aquarium alone due to its easy maintenance.

The most preferred type of aquarium, irrespective of the educational status of the consumers, was the community aquarium. Those with primary education and illiterates had no preference towards planted aquarium as they lacked knowledge in maintaining these aquaria which required intense care and maintenance.

Community aquarium was the highly preferred type by the consumers irrespective of occupational status. Of those owned single species aquarium, 38.00 per cent were private employees, 30.00 per cent self-employed, 22.00 per cent students, 4.00 per cent government employees and 6.00 per cent others. Of the 15 planted aquarium studied, 53.33 per cent were owned by private employees and remaining by those doing own business. Except those owning business, others had not preferred to maintain marine aquarium which demands the use of salt water and stringent maintenance.

The community tank type was the most preferred by both owners and tenants followed by single species and planted aquaria. The marine aquarium was the least preferred among both categories for want of more investment and endurance.

The married consumers mostly preferred community aquarium (55.84%) followed by single species (27.28%), planted (11.69%) and marine (5.19%) aquaria. Similar was the order of preference amongst unmarried respondents also with 52.05, 39.73 and 8.22 per cent for community, single species and planted aquaria respectively.

The consumers of low income category (less than Rs 2.00 lakh annual income) preferred both single species and community aquaria equally (44.64%) followed by planted aquarium (10.72%). However the consumers of middle income group (Rs 2.00 to 5.00 lakh annual income) mostly preferred community aquarium (61.97%) followed by single species (28.17%), planted (7.04%) and marine (2.82%) aquaria. Similar was the order of preference amongst the consumers of high income group (more than Rs 5.00 lakh annual income) with 52.17, 21.74, 17.39 and 8.70 per cent for community, single species, planted and marine aquaria respectively. Huge investment and intense management requirements might be the reasons for the low income group not opting for marine aquarium. Consumers in the ornamental fish sector are typically of affluence with higher than average household income (Murray and Watson 2014) as noted by ornamental fishes being considered luxury goods (Rhyne and Tlusty 2012, Militz et al 2017).

Chi-square analysis showed that there was no significant association of gender, age, experience, educational level, occupation, residential ownership, marital status and annual income of the respondents to aquarium tank types.

Table 1. Consumers' preference for different aquarium tank types

Attribute	Number of respondents					Chi-square
	Type of aquarium				Total	
	Single species	Community	Planted	Marine		
Gender						5.66^{NS}
Male	49	76	15	3	143	
	(34.27)[a]	(53.15)[a]	(10.48)[a]	(2.10)[a]	(100.00)[a]	
	(98.00)[b]	(93.83)[b]	(100.00)[b]	(75.00)[b]	(95.33)[b]	
Female	1	5	0	1	7	
	(14.29)[a]	(71.42)[a]	-	(14.29)[a]	(100.00)[a]	
	(2.00)[b]	(6.17)[b]	-	(25.00)[b]	(4.67)[b]	
Age (years)						5.51^{NS}
Young (≤18)	9	20	1	0	30	
	(30.00)[a]	(66.67)[a]	(3.33)[a]	-	(100.00)[a]	
	(18.00)[b]	(24.69)[b]	(6.67)[b]	-	(20.00)[b]	
Middle (19-35)	28	35	9	3	75	
	(37.33)[a]	(46.67)[a]	(12.00)[a]	(4.00)[a]	(100.00)[a]	
	(56.00)[b]	(43.21)[b]	(60.00)[b]	(75.00)[b]	(50.00)[b]	
Old (>35)	13	26	5	1	45	
	(28.89)[a]	(57.78)[a]	(11.11)[a]	(2.22)[a]	(100.00)[a]	
	(26.00)[b]	(32.10)[b]	(33.33)[b]	(25.00)[b]	(30.00)[b]	
Experience (years)						9.95^{NS}
Beginners	8	14	2	0	24	
	(33.33)[a]	(58.33)[a]	(8.33)[a]	-	(100.00)[a]	
	(16.00)[b]	(17.28)[b]	(13.33)[b]	-	(16.00)[b]	
2 to 5	19	35	4	0	58	
	(32.76)[a]	(60.34)[a]	(6.90)[a]	-	(100.00)[a]	
	(38.00)[b]	(43.21)[b]	(26.67)[b]	-	(38.67)[b]	
6 to 10	11	15	2	2	30	
	(36.67)[a]	(50.00)[a]	(6.67)[a]	(6.67)[a]	(100.00)[a]	
	(22.00)[b]	(18.52)[b]	(13.33)[b]	(50.00)[b]	(20.00)[b]	
>10	12	17	7	2	38	
	(31.58)[a]	(44.74)[a]	(18.42)[a]	(5.26)[a]	(100.00)[a]	
	(24.00)[b]	(20.99)[b]	(46.67)[b]	(50.00)[b]	(25.33)[b]	
Educational status						15.13^{NS}
Illiterate	1	2	0	0	3	
	(33.33)[a]	(66.67)[a]	-	-	(100.00)[a]	
	(2.00)[b]	(2.47)[b]	-	-	(2.00)[b]	
Primary	9	31	0	1	41	
	(21.95)[a]	(75.61)[a]	-	(2.44)[a]	(100.00)[a]	
	(18.00)[b]	(38.27)[b]	-	(25.00)[b]	(27.33)[b]	
Secondary	5	5	2	1	13	
	(38.46)[a]	(38.46)[a]	(15.38)[a]	(7.69)[a]	(100.00)[a]	
	(10.00)[b]	(6.17)[b]	(13.33)[b]	(25.00)[b]	(8.67)[b]	
College	35	43	13	2	93	
	(37.63)[a]	(46.24)[a]	(13.98)[a]	(2.15)[a]	(100.00)[a]	
	(70.00)[b]	(53.09)[b]	(86.67)[b]	(50.00)[b]	(62.00)[b]	
Occupation						7.81^{NS}
Student	11	20	0	0	31	
	(35.48)[a]	(64.52)[a]	-	-	(100.00)[a]	
	(22.00)[b]	(24.69)[b]	-		(20.67)[b]	
Private	19	30	8	0	57	
	(33.33)[a]	(54.39)[a]	(14.04)[a]	-	(100.00)[a]	
	(38.00)[b]	(37.04)[b]	(53.33)[b]	-	(38.00)[b]	
Own business	15	22	7	4	48	
	(31.25)[a]	(45.83)[a]	(14.58)[a]	(8.33)[a]	(100.00)[a]	
	(30.00)[b]	(27.16)[b]	(46.67)[b]	(100.00)[b]	(32.00)[b]	

Government	2	4	0	0	6	
	(33.33)[a]	(66.67)[a]	-	-	(100.00)[a]	
	(4.00)[b]	(4.94)[b]	-	-	(4.00)[b]	
Others	3	5	0	0	8	
	(37.50)[a]	(62.50)[a]	-	-	(100.00)[a]	
	(6.00)[b]	(6.17)[b]	-	-	(5.33)[b]	
Residence ownership						0.95[NS]
Own	30	46	10	3	89	
	(33.71)[a]	(51.68)[a]	(11.24)[a]	(3.37)[a]	(100.00)[a]	
	(60.00)[b]	(56.79)[b]	(66.67)[b]	(75.00)[b]	(59.33)[b]	
Rented	20	35	5	1	61	
	(32.79)[a]	(57.37)[a]	(8.12)[a]	(1.63)[a]	(100.00)[a]	
	(40.00)[b]	(43.21)[b]	(33.33)[b]	(25.00)[b]	(40.67)[b]	
Marital status						6.09[NS]
Married	21	43	9	4	77	
	(27.28)[a]	(55.84)[a]	(11.69)[a]	(5.19)[a]	(100.00)[a]	
	(42.00)[b]	(53.09)[b]	(60.00)[b]	(100.00)[b]	(51.33)[b]	
Unmarried	29	38	6	0	73	
	(39.73)[a]	(52.05)[a]	(8.22)[a]		(100.00)[a]	
	(58.00)[b]	(46.81)[b]	(40.00)[b]		(48.67)[b]	
Annual income (Rs in lakh)						17.13*
Low (<2.00)	25	25	6	0	56	
	(44.64)[a]	(44.64)[a]	(10.72)[a]	-	(100.00)[a]	
	(50.00)[b]	(30.86)[b]	(40.00)[b]	-	(37.34)[b]	
Medium (2.00-5.00)	20	44	5	2	71	
	(28.17)[a]	(61.97)[a]	(7.04)[a]	(2.82)[a]	(100.00)[a]	
	(40.00)[b]	(54.32)[b]	(33.33)[b]	(50.00)[b]	(47.33)[b]	
High (>5.00)	5	12	4	2	23	
	(21.74)[a]	(52.17)[a]	(17.39)[a]	(8.70)[a]	(100.00)[a]	
	(10.00)[b]	(14.82)[b]	(26.67)[b]	(50.00)[b]	(15.33)[b]	

[a]Per cent to row total, [b]Per cent to column total, [NS]Non-significant, *Significant at 5%

Kind of aquarium

Consumers' preference with respect to different kinds of aquarium is given in Table 2.

Among the males, the preference was the highest for stand type (62.94%) followed by cabinet (28.67%) and shelves/showcase (8.39%) types. The females preferred both stand and cabinets equally (42.86%) followed by shelves/showcase (14.28%) aquaria. In all the age groups, the wooden/steel stand kind aquarium was preferred most followed by cabinet and shelves/showcase. Aquarium with wooden/steel stand was the most preferred one by the sample respondents with different levels of experience followed by the cabinet and aquarium in shelves/ showcase. Irrespective of level of education, consumers preferred mostly stand type (either in wooden/steel) followed by cabinet and shelves/ showcase kind of aquaria. Wooden/steel stand was the highly preferred kind of aquarium irrespective of occupational status of the respondents.

Of those who owned wooden/steel stand aquarium, 34.41 per cent were private employees, 31.18 per cent self-employed, 24.73 per cent students, 5.38 per cent government employees and 4.30 per cent others. Of the 44 cabinet type aquarium studied, 43.18 per cent were owned by private employees followed by 38.64 per cent self-employed, 9.09 per cent students, 2.27 per cent government employees and 6.82 per cent others. The government employees and other respondents showed less interest in cabinet type aquarium which could be probably due to the lack of time and unwillingness to spend money. Thus it could be inferred that wooden/steel stand was the most preferred by both owners and tenants of the residence (62.92 and 60.65% respectively) followed by cabinet and shelves/showcase aquaria. The preference for cabinet and shelves/showcase aquaria was least among both groups as it was bit expensive and not tailor-made many times.

The married consumers showed higher preference for wooden/steel stand aquarium (59.74%) followed by cabinet (32.47%) and shelves/showcase (7.79%) aquaria. Similar was the case of unmarried consumers also with 64.38, 26.03 and 9.59 per cent for wooden/steel type, cabinet aquarium and shelves/

Table 2. Consumers' preference for different kinds of aquarium

Attribute	Number of respondents				Chi-square
	Kind of aquarium			Total	
	Wooden/steel stand	Cabinet	Shelves/showcase		
Gender					2.16^{NS}
Male	90	41	12	143	
	(62.94)[a]	(28.67)[a]	(8.39)[a]	(100.00)[a]	
	(96.77)[b]	(93.18)[b]	(92.31)[b]	(95.33)[b]	
Female	3	3	1	7	
	(42.86)[a]	(42.86)[a]	(14.28)[a]	(100.00)[a]	
	(3.23)[b]	(6.82)[b]	(7.69)[b]	(4.67)[b]	
Age (years)					3.98^{NS}
Young (≤18)	22	5	3	30	
	(73.33)[a]	(16.67)[a]	(10.00)[a]	(100.00)[a]	
	(23.65)[b]	(11.36)[b]	(23.07)[b]	(20.00)[b]	
Middle (19-35)	41	26	7	74	
	(55.41)[a]	(35.14)[a]	(9.45)[a]	(100.00)[a]	
	(44.09)[b]	(59.09)[b]	(53.85)[b]	(49.33)[b]	
Old (>35)	30	13	3	46	
	(65.22)[a]	(28.26)[a]	(6.52)[a]	(100.00)[a]	
	(32.26)[b]	(29.55)[b]	(23.08)[b]	(30.67)[b]	
Experience (years)					7.38^{NS}
Beginners	13	8	3	24	
	(54.17)[a]	(33.33)[a]	(12.50)[a]	(100.00)[a]	
	(13.98)[b]	(18.18)[b]	(23.08)[b]	(16.00)[b]	
2 to 5	40	11	7	58	
	(68.96)[a]	(18.97)[a]	(12.07)[a]	(100.00)[a]	
	(43.01)[b]	(25.00) [b]	(53.85) [b]	(38.67) [b]	
6 to 10	19	10	1	30	
	(63.34)[a]	(33.33)[a]	(3.33)[a]	(100.00)[a]	
	(20.43)[b]	(22.73)[b]	(7.69)[b]	(20.00)[b]	
>10	21	15	2	38	
	(55.27)[a]	(39.47)[a]	(5.26)[a]	(100.00)[a]	
	(22.58)[b]	(34.09)[b]	(15.38)[b]	(25.33)[b]	
Educational status					6.57^{NS}
Illiterate	2	0	1	3	
	(66.67)[a]	-	(33.33)[a]	(100.00)[a]	
	(2.15)[b]	-	(7.69)[b]	(2.00)[b]	
Primary	26	10	5	41	
	(63.41)[a]	(24.39)[a]	(12.20)[a]	(100.00)[a]	
	(27.96)[b]	(22.72)[b]	(38.46)[b]	(27.33)[b]	
Secondary	7	6	0	13	
	(53.85)[a]	(46.15)[a]	-	(100.00)[a]	
	(7.53)[b]	(13.64)[b]	-	(8.67)[b]	
College	58	28	7	93	
	(62.37)[a]	(30.10)[a]	(7.53)[a]	(100.00)[a]	
	(62.36)[b]	(63.64)[b]	(53.85)[b]	(62.00)[b]	
Occupation					9.01^{NS}
Student	23	4	4	31	
	(74.20)[a]	(12.90)[a]	(12.90)[a]	(100.00)[a]	
	(24.73)[b]	(9.09)[b]	(30.77)[b]	(20.67)[b]	
Private	32	19	6	57	
	(56.14)[a]	(33.33)[a]	(10.53)[a]	(100.00)[a]	
	(34.41)[b]	(43.18)[b]	(46.16)[b]	(38.00)[b]	
Own business	29	17	2	48	
	(60.42)[a]	(35.42)[a]	(4.16)[a]	(100.00)[a]	
	(31.18)[b]	(38.64)[b]	(15.38)[b]	(32.00)[b]	

Government	5	1	0	6	
	(83.33)[a]	(16.67)[a]	-	(100.00)[a]	
	(5.38)[b]	(2.27)[b]	-	(4.00)[b]	
Others	4	3	1	8	
	(50.00)[a]	(37.50)[a]	(12.50)[a]	(100.00)[a]	
	(4.30)[b]	(6.82)[b]	(7.69)[b]	(5.33)[b]	
Residence ownership					0.95[NS]
Own	56	24	9	89	
	(62.92)[a]	(26.97)[a]	(10.11)[a]	(100.00)[a]	
	(60.22)[b]	(54.55)[b]	(69.23)[b]	(59.33)[b]	
Rented	37	20	4	61	
	(60.65)[a]	(32.78)[a]	(6.57)[a]	(100.00)[a]	
	(39.78)[b]	(45.45)[b]	(30.77)[b]	(40.67)[b]	
Marital status					0.88[NS]
Married	46	25	6	77	
	(59.74)[a]	(32.47)[a]	(7.79)[a]	(100.00)[a]	
	(49.46)[b]	(56.82)[b]	(46.15)[b]	(51.33)[b]	
Unmarried	47	19	7	73	
	(64.38)[a]	(26.03)[a]	(9.59)[a]	(100.00)[a]	
	(50.54)[b]	(43.18)[b]	(53.85)[b]	(48.67)[b]	
Annual income (Rs in lakh)					0.98[NS]
Low (<2.00)	34	16	6	56	
	(60.72)[a]	(28.57)[a]	(10.71)[a]	(100.00)[a]	
	(36.56)[b]	(36.37)[b]	(46.16)[b]	(37.33)[b]	
Medium	46	20	5	71	
(2.00-5.00)	(64.79)[a]	(28.17)[a]	(7.04)[a]	(100.00)[a]	
	(49.46)[b]	(45.45)[b]	(38.46)[b]	(47.34)[b]	
High (>5.00)	13	8	2	23	
	(56.52)[a]	(34.78)[a]	(8.70)[a]	(100.00)[a]	
	(13.98)[b]	(18.18)[b]	(15.38)[b]	(15.33)[b]	

[a]Per cent to row total, [b]Per cent to column total, [NS]Non-significant

showcase respectively. The consumers of low income category (less than Rs 2.00 lakh annual income) mostly preferred wooden/steel stand (60.72%) followed by cabinet (28.57%) and shelves/showcase (10.71%). Almost similar was the order of preference among the consumers of middle income (Rs 2.00 to 5.00 lakh annual income) and high income groups (more than Rs 5.00 lakh annual income).

The chi-square analysis showed that there was no significant association of gender, age, experience level, educational level, occupation, residential ownership, marital status and annual income of the respondents to kind of ornamental aquarium.

Size of aquarium

The preference of the consumers with respect to size of aquarium is depicted in Table 3.

Male consumers mostly preferred medium size tank measuring 3.5' length (46.15%) followed by small measuring less than 2' length (35.67%) and large measuring more than 5' (18.18%). However female respondents preferred medium and small tanks equally (42.86%) followed by large tanks (14.28%). The youngsters under 18 years of age mostly preferred small size tanks (53.33%) followed by medium (40.00%) and large (6.67%). However the order of preference for size of tanks among middle and adult age groups was medium, small and large size tanks. Chi-square analysis indicated that there was no significant association of gender and age of respondents to aquarium tank size.

The beginners with less than one year of experience preferred small and medium size tanks equally (50.00%). The consumers with 2-5 years of experience in ornamental fish rearing preferred small (46.55%) followed by medium (41.38%) and large (12.07%) tanks. The consumers with 6 and more years of experience showed an order of preference of medium, large and small size tanks. The statistical analysis with a chi-square value of 18.23 showed a significant association between experience levels and size of aquarium tanks.

Table 3. Consumers' preference for different sizes of aquarium

Attribute	Number of respondents				Chi-square
	Size of aquarium			Total	
	Small	Medium	Large		
Gender					0.17[NS]
Male	51	66	26	143	
	(35.67)[a]	(46.15)[a]	(18.18)[a]	(100.00)[a]	
	(94.44)[b]	(95.65)[b]	(96.30)[b]	(95.33)[b]	
Female	3	3	1	7	
	(42.86)[a]	(42.86)[a]	(14.28)[a]	(100.00)[a]	
	(5.56)[b]	(4.35)[b]	(3.70)[b]	(4.67)[b]	
Age (years)					9.74**
Young (≤18)	16	12	2	30	
	(53.33)[a]	(40.00)[a]	(6.67)[a]	(100.00)[a]	
	(29.63)[b]	(17.39)[b]	(7.41)[b]	(20.00)[b]	
Middle (19-35)	21	37	16	74	
	(28.38)[a]	(50.00)[a]	(21.62)[a]	(100.00)[a]	
	(38.89)[b]	(53.62)[b]	(59.26)[b]	(49.33)[b]	
Old (>35)	17	20	9	46	
	(36.96)[a]	(43.48)[a]	(19.56)[a]	(100.00)[a]	
	(31.48)[b]	(28.99)[b]	(33.33)[b]	(30.67)[b]	
Experience (years)					18.23**
Beginners	12	12	0	24	
	(50.00)[a]	(50.00)[a]	-	(100.00)[a]	
	(22.22)[b]	(17.39)[b]	-	(16.00)[b]	
2 to 5	27	24	7	58	
	(46.55)[a]	(41.38)[a]	(12.07)[a]	(100.00)[a]	
	(50.00)[b]	(34.78)[b]	(25.93)[b]	(38.67)[b]	
6 to 10	8	13	9	30	
	(26.67)[a]	(43.33)[a]	(30.00)[a]	(100.00)[a]	
	(14.82)[b]	(18.84)[b]	(33.33)[b]	(20.00)[b]	
>10	7	20	11	38	
	(18.42)[a]	(52.63)[a]	(28.95)[a]	(100.00)[a]	
	(12.96)[b]	(28.99)[b]	(40.74)[b]	(25.33)[b]	
Educational status					20.37**
Illiterate	1	1	1	3	
	(33.33)[a]	(33.33)[a]	(33.33)[a]	(100.00)[a]	
	(1.85)[b]	(1.45)[b]	(13.70)[b]	(2.00)[b]	
Primary	25	12	4	41	
	(60.97)[a]	(29.27)[a]	(9.76)[a]	(100.00)[a]	
	(46.30)[b]	(17.39)[b]	(14.81)[b]	(27.33)[b]	
Secondary	4	9	0	13	
	(30.77)[a]	(69.23)[a]		(100.00)[a]	
	(7.41)[b]	(13.04)[b]		(8.67)[b]	
College	24	47	22	93	
	(25.81)[a]	(50.55)[a]	(23.66)[a]	(100.00)[a]	
	(44.44)[b]	(68.12)[b]	(81.48)[b]	(62.00)[b]	
Occupation					6.53[NS]
Student	16	12	3	31	
	(51.61)[a]	(38.71)[a]	(9.68)[a]	(100.00)[a]	
	(29.63)[b]	(17.39)[b]	(11.11)[b]	(20.67)[b]	
Private	20	27	10	57	
	(35.09)[a]	(47.37)[a]	(17.54)[a]	(100.00)[a]	
	(37.04)[b]	(39.13)[b]	(37.04)[b]	(38.00)[b]	
Own business	14	23	11	48	
	(29.17)[a]	(47.91)[a]	(22.92)[a]	(100.00)[a]	
	(25.92)[b]	(33.33)[b]	(40.74)[b]	(32.00)[b]	

Government	1	4	1	6	
	(16.67)[a]	(66.66)[a]	(16.67)[a]	(100.00)[a]	
	(1.85)[b]	(5.80)[b]	(3.70)[b]	(4.00)[b]	
Others	3	3	2	8	
	(37.50)[a]	(37.50)[a]	(25.00)[a]	(100.00)[a]	
	(5.56)[b]	(4.35)[b]	(7.41)[b]	(5.33)[b]	
Residence ownership					14.00**
Own	26	39	24	89	
	(29.21)[a]	(43.82)[a]	(26.97)[a]	(100.00)[a]	
	(48.15)[b]	(56.52)[b]	(88.89)[b]	(59.33)[b]	
Rented	28	30	3	61	
	(45.90)[a]	(49.18)[a]	(4.92)[a]	(100.00)[a]	
	(51.85)[b]	(43.48)[b]	(11.11)[b]	(40.67)[b]	
Marital status					3.46[NS]
Married	27	40	10	77	
	(35.06)[a]	(51.95)[a]	(12.99)[a]	(100.00)[a]	
	(50.00)[b]	(57.97)[b]	(37.04)[b]	(51.33)[b]	
Unmarried	27	29	17	73	
	(36.98)[a]	(39.73)[a]	(23.29)[a]	(100.00)[a]	
	(50.00)[b]	(42.03)[b]	(62.96)[b]	(48.67)[b]	
Annual income (Rs in lakh)					6.12[NS]
Low (<2.00)	25	20	11	56	
	(44.64)[a]	(35.72)[a]	(19.64)[a]	(100.00)[a]	
	(46.29)[b]	(28.98)[b]	(40.74)[b]	(37.33)[b]	
Medium (2.00-5.00)	20	40	11	71	
	(28.17)[a]	(56.34)[a]	(15.49)[a]	(100.00)[a]	
	(37.04)[b]	(57.97)[b]	(40.74)[b]	(47.34)[b]	
High (>5.00)	9	9	5	23	
	(39.13)[a]	(39.13)[a]	(21.74)[a]	(100.00)[a]	
	(16.67)[b]	(13.05)[b]	(18.52)[b]	(15.33)[b]	

[a]Per cent to row total, [b]Per cent to column total, [NS]Non-significant, **Significant at 1%

Those with primary education mostly preferred small size aquarium while secondary and college level educated preferred medium size aquarium. Consumers with college level education had preference to the selection of different types of aquaria as they were more interested in fish keeping. There existed a significant association between the aquarium size and educational status among ornamental fish consumers.

The students preferred small (51.61%) and the employees of private sector and government sector and self-employed preferred medium size tanks (47.37, 66.66 and 47.91% respectively). Other respondents (which included retired, housewives and job seekers) preferred small and medium size tanks equally (37.50%). The preference for small size tanks by the students could be attributed to their easy maintenance and cheaper cost. The results of the chi-square analysis showed no significant association between occupational status and aquarium tank sizes.

From the results it can be inferred that medium size tanks were most preferred by the both owners and tenants of the residence followed by small and large size tanks. The results implied that the consumers with own residence preferred the large and medium size tanks as they could have permanent aquarium tank setting. The consumers residing in rented houses did not have the permanent aquarium setting and they frequently changed the place of residence and hence they preferred for small or medium size tanks. The statistical analysis with a chi-square value of 14.00 showed a significant association between residence ownership status and size of aquarium tanks.

Married consumers preferred the medium (51.95%) followed by the small (35.06%) and large (12.99%) size tanks. Same was the order of preference among unmarried consumers also for medium, small and large size tanks (39.73, 36.98 and 23.29% respectively). The results of the chi-square analysis showed no significant association between marital status and aquarium tank size.

The consumers of low income category (less than Rs 2.00 lakh as annual income) mostly preferred

small (44.64%) followed by medium (35.72%) and large (19.64%) tanks. In case of consumers of middle income group (Rs 2.00 to 5.00 lakh annual income), the preference was in the order of medium, small and large tanks, while high income group (more than Rs 5.00 lakh annual income) exhibited equal preference for small and medium followed by large tanks. Chi-square analysis also indicated that there was no significant association between annual income categories and size of ornamental aquarium.

Consumers' preference: size vs kind vs type of aquarium

The consumers' preference for ornamental aquarium based on size, kind and type is given in Table 4. Overall results showed that 62.00 per cent of the consumers preferred the wooden/steel stand kind aquarium followed by cabinet (29.33%) and shelves/ showcase (8.67%). The consumers of stand type ornamental fish aquarium showed high preference (62.00%) towards community aquarium (56.99%)

Table 4. Consumers' preference for ornamental aquarium: size vs kind vs type of aquarium

Size	Kind	Number of respondents				
		Aquarium type				Total
		Single species	Community	Planted	Marine	
Small	Stand	10	23	4	0	37
		(27.03)[a]	(62.16)[a]	(10.81)[a]	-	(100.00)[a]
		(62.50)[b]	(67.65)[b]	(100.00)[b]	-	(68.52)[b]
	Cabinet	2	6	0	0	8
		(25.00)[a]	(75.00)[a]	-	-	(100.00)[a]
		(12.50)[b]	(17.65)[b]	-	-	(14.81)[b]
	Shelves/ showcase	4	5	0	0	9
		(44.44)[a]	(55.56)[a]	-	-	(100.00)[a]
		(25.00)[b]	(14.70)[b]	-	-	(16.67)[b]
	Overall	16	34	4	0	54
		(29.63)[a]	(62.96)[a]	(7.41)[a]	-	(100.00)[a]
		(100.00)[b]	(100.00)[b]	(100.00)[b]	-	(100.00)[b]
Medium	Stand	12	26	4	0	42
		(28.57)[a]	(61.91)[a]	(9.52)[a]	-	(100.00)[a]
		(63.16)[b]	(65.00)[b]	(56.14)[b]	-	(60.87)[b]
	Cabinet	7	12	3	3	25
		(28.00)[a]	(48.00)[a]	(12.00)[a]	(12.00)[a]	(100.00)[a]
		(36.84)[b]	(30.00)[b]	(42.86)[b]	(100.00)[b]	(36.23)[b]
	Shelves/ showcase	0	2	0	0	2
		-	(100.00)[a]	-	-	(100.00)[a]
		-	(5.00)[b]	-	-	(2.90)[b]
	Overall	19	40	7	3	69
		(27.54)[a]	(57.97)[a]	(10.14)[a]	(4.35)[a]	(100.00)[a]
		(100.00)[b]	(100.00)[b]	(100.00)[b]	(100.00)[b]	(100.00)[b]
Large	Stand	9	4	1	0	14
		(64.29)[a]	(28.57)[a]	(7.14)[a]	-	(100.00)[a]
		(60.00)[b]	(57.14)[b]	(25.00)[b]	-	(51.85)[b]
	Cabinet	5	2	3	1	11
		(45.46)[a]	(18.18)[a]	(27.27)[a]	(9.09)[a]	(100.00)[a]
		(33.33)[b]	(28.57)[b]	(75.00)[b]	(100.00)[b]	(40.74)[b]
	Shelve/showcase	1	1	0	0	2
		(50.00)[a]	(50.00)[a]	-	-	(100.00)[a]
		(6.67)[b]	(14.29)[b]	-	-	(7.41)[b]
	Overall	15	7	4	1	27
		(55.56)[a]	(25.93)[a]	(14.81)[a]	(3.70)[a]	(100.00)[a]
		(100.00)[b]	(100.00)[b]	(100.00)[b]	(100.00)[b]	(100.00)[b]
Overall	Stand	31	53	9	0	93
		(33.33)[a]	(56.99)[a]	(9.68)[a]	-	(100.00)[a]
		(62.00)[b]	(65.43)[b]	(60.00)[b]	-	(62.00)[b]

Cabinet	14	20	6	4	44
	(31.82)[a]	(45.45)[a]	(13.64)[a]	(9.09)[a]	(100.00)[a]
	(28.00)[b]	(24.69)[b]	(40.00)[b]	(100.00)[b]	(29.33)[b]
Shelve/ showcase	5	8	0	0	13
	(38.46)[a]	(61.54)[a]	-	-	(100.00)[a]
	(10.00)[b]	(9.88)[b]	-	-	(8.67)[b]
Overall	50	81	15	4	150
	(33.33)[a]	(54.00)[a]	(10.00)[a]	(2.67)[a]	(100.00)[a]
	(100.00)[b]	(100.00)[b]	(100.00)[b]	(100.00)[b]	(100.00)[b]

[a]Per cent to row total, [b]Per cent to column in respective size category

followed by single species (33.33%) and planted (9.68%) aquaria. Cabinet aquarium consumers preferred mostly community aquarium (45.45%) followed by single species (31.82%), planted (13.64%) and marine (9.09%) aquaria. Among shelves/showcase kind aquarium consumers, 61.54 per cent preferred the community aquarium followed by single species aquarium (38.46%).

In case of the size of aquarium, consumers mostly preferred medium followed by small and large size tanks. The consumers with medium size tanks preferred to have wooden/steel stand aquaria (60.87%) with community aquarium (65.00%) followed by single species tank (28.57%) and had least preference for planted aquarium (9.52%). Cabinet aquarium consumers with medium size also showed the same pattern of preference. In small sized tank, 68.52 per cent of the consumers preferred the wooden/steel kind with community aquarium followed by single species and planted aquaria. The small size cabinet aquarium consumers preferred to have community aquarium followed by single species.

For the large size tanks, single species was the most preferred (55.56%) followed by community (25.93%), planted (14.81%) and marine (3.70%) aquaria. The consumers' preference was for large size tanks with steel/wooden stand (51.85%) followed by cabinet aquarium (40.74%) and aquarium in shelves/ showcase (7.41%). Overall, for marine aquarium, medium size cabinets (12.00%) were preferred followed by the large size tanks (9.09%). By comparing all the kinds and types with different size aquaria, medium size wooden/steel aquarium with community of species was most preferred.

CONCLUSION

Most of the consumers preferred the community aquarium followed by single species, planted and marine aquaria. In the aquarium kind, the wooden/steel stand was most preferred compared to cabinet and aquarium kept in shelves/showcase. Overall, medium size tanks were mostly preferred followed by small and large. By comparing all the kinds and types with different size aquaria, medium size wooden/steel aquarium with community of species was most preferred. The most relevant factor for ornamental fish consumers was the fish care level followed by the tank type and the ornamental fish size. Large size fishes which require less care and are reared in community tank were highly preferred while least preferred were the small size fishes in planted aquarium which require intense care.

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