

**RESEARCH
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ABSTRACTS**



MUTAGENICITY TESTING OF PHENOL DERIVATIVES ON *ALLIUM CEPA* ROOT TIP MERISTEMS

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ABSTRACT

Phenol derivatives are the major constituents of chemicals used for domestic cleaning purposes. A study has been undertaken to evaluate the impact of these toxic chemicals on the environment using *Allium cepa* root tip assay. Four different concentrations (0.25%, 0.5%, 1% and 2%) of the commercially available cleaning solution phenyl were tested for its activity on dividing plant cells. Distilled water was used as control. The test solution was found to inhibit cell division in *Allium cepa* at the even the lowest concentration used and also induced many chromosomal aberrations in the dividing cells. Aberrations included nuclear lesions, chromosome bridges, hyperchromasia, micronuclei formation, chromosome fragments etc.

Key words: Environmental toxicity, *Allium cepa*, phenyl, chromosomal aberrations

INTRODUCTION

Chemical poisoning is a major public health concern. Approximately 95% of all accidental or intentional poisonings are due to chemicals. Chronic exposure to polluted air may cause lung infections, headaches, nausea, mental confusion, fatigue, depression, and memory loss. In addition, they may cause damage to an unborn foetus and increase the risk of developing cancer. Phenyls are commonly used for household cleaning purposes. In the present study commercial phenyl solution was used to evaluate its cytotoxic and mutagenic properties on plant cells. The major ingredients of this solution are chlorinated xyleneol and chlorinated phenol.

Several higher plant bioassays for screening and monitoring environmental mutagens have been established (Maluszynaska and Juchimiuk, 2005). The detection of genotoxicity of hazardous chemicals has been studied for many years using higher plants as biological systems (Rank et al., 2002). Plant assays are useful for testing of complex environmental samples such as wastewater (Grover and Kaur 1999), wastewater sludge (Rank and Nielson, 1998), contaminated river water (Ivanova et al., 2005) and soils (Chang et al., 1997; Kovalchuk et al., 1998; Cotelle et al., 1999). Mutagenicity testing is utilizing one of the oldest methods, namely the observation of chromosomal aberrations. The common onion, *Allium cepa* L. makes a convenient test system for estimating harmful effects of chemicals on biological materials (Fiskesjo, 1985; Fiskesjo, 1993;

Rank and Nielson, 1998). Because of its excellent chromosome conditions, the *Allium cepa* genetic material has been widely exploited for such purposes.

MATERIALS AND METHODS

1. Preparation of test solutions

Commercially available phenyl solution was used to test the cytotoxicity on *Allium cepa* root tip meristematic cells. Four different concentrations of the test solution were prepared (0.25%, 0.5%, 1% and 2%) for evaluating the cytotoxic action.

2. *Allium cepa* root tip assay

Fresh and healthy bulbs of *Allium cepa* were obtained from the local market. The bulbs were germinated over water before being transferred to the test solutions. When the roots were about 5 mm long, the bulbs were placed on beakers containing the four different concentrations (0.25%, 0.5%, 1%, and 2%), such that the roots were immersed in the solutions. The duration of treatments was 2h, 1h and 30 minutes. The sprouted roots were also treated with distilled water, which served as control. The experimental set up had five replicates.

The root tips were fixed in Carnoy's fluid (1 part of glacial acetic acid: 2 parts of absolute alcohol) after the treatment. These were hydrolysed in 1N HCl for 5 minutes. The squashing was done over 2% aceto - orcein stain. The slides were then scanned under Leica DM 1000 trinocular research microscope and photomicrographs were taken.

The numbers of cells, dividing and non- dividing, were recorded. The degree of chromosomal aberration was measured as the number of aberrant cells to the total number of cells examined. Mitotic index was calculated by expressing the number of dividing cells as a percentage of total cells counted for each of the treatments and the control.

$$\text{Mitotic Index} = \frac{\text{Number of dividing cells}}{\text{Total number of cells}} \times 100$$

3. Statistical analysis

The data were subjected to statistical analysis using one way analysis of variance (ANOVA) followed by appropriate post-hoc tests. The means with standard errors of the mitotic indices and chromosome aberrations for each concentration of the extracts were calculated. Statistical significance was accepted for $p < 0.05$ (Auti *et al.*, 2010). All statistical analyses were carried out using SPSS 17.0 statistical package.

RESULTS AND DISCUSSION

Mitosis was normal in the root tips kept as control, whereas the mitotic indices of all the roots treated with the test solutions were significantly lower than the mitotic index of control. The mitotic index rates were found decreasing with increasing concentrations of the test solution compared with the control.

There were significant differences ($p < 0.05$) between treated groups and control group in mitotic index. The low mitotic index observed in the treated root tips may be attributed to the direct effect of the phenyl solution on the root tips. The percentage of mitotic indices and chromosomal aberrations induced by different concentrations of the tested chemical at different treatment durations are summarised in Table 1.

Chromosome aberrations were observed in all stages of mitosis. Nuclear lesions were one of the major chromosomal aberrations observed in almost all the concentrations tested. Other major anomalies included binucleate cells, chromosome bridges, chromosome fragments, hyperchromasia, shift in MTOC at anaphase, vagrant chromosomes at metaphase, sticky anaphases, micronuclei, diagonal anaphases, misoriented anaphases etc.

Decrease in mitotic index rates explains cytotoxicity of the chemical used. This might be due to the obstruction of the onset of prophase, the arrest of mitotic phases, or reduction in the rate of cell progression through mitosis. Reduction in the mitotic activity could also be due to inhibition of DNA synthesis or a blocking in the G2 phase of the cell cycle, preventing the cell from entering mitosis [Christopher and Kapoor, 1988].

The increase of pollution by the release of genotoxic chemicals and the increase of radiation levels have affected the ecosystem and the health of organisms, including humans. In the present study the effect of the hazardous chemical, phenyl was evaluated only on plant cells. Further studies may be undertaken for analysing the toxic effect of these chemicals on animal health.

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On earth, more than 80,000 are medicinal in nature. About 5000 species are extensively used in traditional systems of medicine and are studied in some detail. Many medicinal plants used in modern medicine occupy a very significant place as raw material for important drugs. Plants contain many bioactive chemical substances that produce definite physiological and biochemical actions in human body. Zingiberaceae family constitutes a vital group of rhizomatous medicinal and aromatic plants characterized by the presence of volatile oils and oleoresins. *K. galangal* L., commonly known as 'acholam' or 'sugandhavacha' or 'chandramulika' or 'sidhul' is a rhizomatous perennial plant, the rhizomes of which yield an essential oil. Since the rhizomes contain volatile oil and other important compounds of enormous medicinal values, they are demanding to the traditional health care practitioner. The present studies gave an insight into bioactive principles of rhizome of *K. galanga*. Since it is a preliminary study further more detailed evaluation, characterization and identification is needed to exploit the potential of this plant.

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Cytotoxic potential of the aqueous leaf extracts of *Hyptis suaveolens* (L.) Poir. and *Leucas indica* (L.) R. Br.

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Hyptis suaveolens and *Leucas indica*, two common weeds were selected for the present study, to reveal the probable cytotoxic potential. The meristematic root tips of *Allium cepa* were used for testing the cytotoxic property of the aqueous leaf extracts containing both polar and non-polar compounds, and that containing polar compounds alone, at different concentrations (0.125%, 0.25%, 0.5%, 1% and 2%) and at different time durations, using distilled water as control. Mitotic squash preparations were made according to improved techniques of Sharma and Sharma (1990). The mitotic index of the treated root tip cells was found to be decreasing and the abnormality percentage was found to be increasing with increase in extract concentration when compared to the control. Maximum cytotoxicity was observed in the extract containing both polar and non-polar compounds. Both the tested plants were found to be cytotoxic on the root tip cells of *Allium cepa*, but *Hyptis suaveolens* was found to be more effective. The abnormalities noticed were of both clastogenic and non-clastogenic types. The clastogenic abnormalities observed were nuclear lesions, fragmentation of chromosomes, chromosome bridges, chromosome stickiness, chromosome pulverisation etc. The non-clastogenic abnormalities observed were chromosome clumping, diagonal orientation of chromosomes at metaphase and anaphase, ball metaphase, early movement of chromosomes, misorientation of chromosome groups, lagging of chromosomes, non-synchronous movement of chromosomes, C-metaphase, binucleate cells, chromosome scattering etc. This shows the intense cytotoxic activity of the two weeds, which can be effectively exploited as herbal pesticide.

Keywords: *Hyptis suaveolens*, *Leucas indica*, *Allium cepa* assay, aberrations, mitotic index

Analysis of Angiosperm Diversity and Endemism in the Tropical Montane (Shola) Forests of Kerala State, South India

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Abstract

A detailed floristic expedition was carried out for more about a decade in various Tropical Montane (Shola) forest regions of Kerala State, South India, for analyzing the plant diversity, endemism and the conservational importance of Sholas. The study areas comprised major shola forest regions of Idukki High ranges in Kerala such as Mannavan Shola (the largest shola forest of the state), Pambadam Shola, Pullaradi Shola, Idivara Shola, Sholas of Eravikulam National Park, Vellari Mala Shola of Wayand etc. A total of 669 angiosperm and 93 pteridophyte taxa were collected from the study areas, which indicated the high diversity prevailing in these regions. The collection of pteridophytes, comprised 27.6% of the total pteridophyte flora of the state (337 species). Among the 669 angiosperm taxa collected, 246 (36.8%) were endemics, out of which more than 30 % of the plants were endemic to Western Ghat regions only and about 6 % were endemic to South India. These figures substantiated the general view that sholas are megacentres of endemism.

About seven plants, which were considered as '*possibly extinct*', could also be rediscovered. This include *Actinodaphne bourneae* Gamble, *Arisaema attenuatum* Barnes & C.E.C. Fisch., *Arisaema psittacus* Barnes, *Impatiens anaimudica* C.E.C. Fisch., *Impatiens platyadena* C.E.C. Fisch., *Pimpinella pulneyensis* Gamble and *Symplocos monantha* Wight. About 70 plants, including 15 pteridophytes could also be located for the first time from the state. Thorough explorations in the area may lead to the discovery of more new taxa, since many of the regions remain still unexplored due to inaccessibility and hostile environments. In short, the sholas which are floristically unique in all respects, have to be protected and explored thoroughly to elucidate the floral diversity and status of the endemics, before they get extinct due to degradation, depletion or conversion of natural vegetation.

Key words: Shola, Tropical montane, diversity, endemism, conservation

Introduction

'Sholas' are 'Tropical Montane Forests' situated in the higher mountain tracts of the Western Ghats, above 1500 m. They are the continuation of the 'Tropical Wet Evergreen Forests' in the higher altitudes (Champion, 1935, 1936; Champion & Seth, 1968; Meher-Homji, 1984). 'Sholas' are very characteristic vegetation. They are generally found restricted to the sheltered valleys, glens, hollows and depressions owing to their fastidiousness as regards to soil moisture. The trees are stunted, profusely branched, without a straight bole and with an umbrella shaped canopy. The crooked branches are densely covered with epiphytic mosses, ferns, lichens and orchids. The species are basically of a tropical stock. But, temperate species dominate in the forest ecotones. They have often been referred to as living fossils, because of their inability to expand, due to the nature of the climatic conditions in the area (Vishnu-Mittre & Gupta, 1965).

In the state of Kerala, typical shola forests are distributed along the crest of the Western Ghats, where the altitude goes beyond 1500 m. Eravikulam (located in the High ranges of Idukki district), Devarmala (Pathanamthitta), Agasthyamala (Thiruvananthapuram), Sispara Ghat (Palakkad), New Amarambalam reserve

forest (Malappuram), Vellarimala sholas (Kozhikode) and Brahmagiri hills (Wayanad) are some of the prominent regions. Some of these regions are actually extensions of the forest types of Tamilnadu state, from the Nilgiris, Pulneys or Anamalai hills. However, it is to be noted that majority of shola forests are distributed in the 'High ranges' of Idukki district and even the largest shola forest of the state, namely Mannavan Shola (presently under Anamudi Shola National Park), is located in this region (Balasubramaniam & Kumar, 1999; Kumar, 2004). In total, the area under shola-grassland vegetation in Kerala is estimated to be approximately 70 km² (CESS, 1984).

Very few studies have been conducted in the shola forests of Kerala, perhaps due to their remote occurrence and unfavourable climates. A comparable floristic account of the shola forests of Kerala is due to the pioneering studies of Sebastine and Vivekananthan (1967) and Shetty & Vivekananthan (1968, 1970, 1971, 1972, 1973a, 1973b, 1975 and 1991). Rice (1984), Jose *et al.* (1994), Karunakaran (1997), Karunakaran *et al.* (1997) etc have added further documentation on the plant wealth and ecology of the region. But since most of these studies were concentrated mainly on the ecological aspects, botany of the region remained scanty. Later, Swarupananadan *et al.* (1998, 2000) conducted some studies on the floristic and ecological aspects of a few sholas of the High Ranges of Idukki district, which was later, broadened to other areas of the state by Kumar (2004) as a continuation of the research project. In the mean time, research activities on various aspects on the shola forests of the state were initiated. These works were later compiled into the form of a book by Nair *et al.* (2001).

Materials and methods

Regular field trips were organized to Mannavan Shola, Idlimottai Sholas, Pullaradi Shola, Pambadam Shola and Eravikulam National Park for collecting plant specimens. A few trips were carried out to Silent Valley (Palakkad) and Vellarimala (Kozhikode) regions also. Collections were brought to the field stations and herbaria prepared as per standard procedure (Fosberg and Sachet, 1965; Bridson and Forman, 1991). Flowers and fruits of almost all specimens or even the whole plants (if small) were preserved either in *Formalin Aceto Alcohol* (FAA) or *Kew mixture* (9 parts of 70 % Ethyl alcohol, ½ part of 40% Formaldehyde and ½ part of Conc. Acetic acid) for further microscopical studies. Large fruits were dried and poisoned separately to keep the shape unchanged. All the herbarium specimens are deposited in *Kerala Forest Research Institute Herbarium* (KFRI), Peechi.

The specimens were critically studied and identifications were made initially with the help of the *Flora of the Presidency of Madras* (Gamble, 1915-1936), *Flora of British India* (Hooker, 1872-1897), Fyson's *Flora of the Nilgiri and Pulney Hill-tops* (1915-1921), *Flora of South Indian Hill Stations* (1932), *Flora of Palni Hills* (Matthew, 1999) etc. Illustrations of the species available in Wight's, *Icones Plantarum Indiae Orientalis* (1838-1853), both the works of Fyson (1915-21; 1932) and those in *Illustrations on the Flora of Palni Hills* (Matthew, 1996) and the *Supplement to Illustrations on the Flora of the Palni Hills* (Matthew, 1998) were referred for identification. Available monographs and revisions were also consulted. Several literature on phytogeographical studies and the internet cites of IPNI (www.ipni.org) were also referred to get the world distribution of each species. Specimens were also taken to the *Madras Herbarium* (MH) at Coimbatore and the *Calicut University Herbarium* (CALI) for verification and confirmation. Those, which needed further confirmation, were referred to experts in the concerned groups in India and abroad. Apart from those collected during the study period, specimens collected earlier from the study area by others and available at MH, CALI and KFRI were also referred to for the present study.

Since Pteridophytes form a major part of the flora of shola forests, systematic collection of the pteridophytes was also done. Most of the plants, except a few large ones and tree ferns, were collected in full including the rhizomes by uprooting them. Identification of the specimens was done mainly using pertinent

literature such as Beddome (1863-1864, 1865-70, 1876, 1883 and 1892), Manickam (1986, 1989, 1995), Manickam and Ninan (1984), Manickam and Irudayaraj (1992), Nayar and Geevarghese (1993), Hameed *et al.* (2003), various monographs, M. Phil. and Ph. D. dissertations and hundreds of other publications on pteridophytes. Doubtful specimens were sent to experts and got confirmed.

Publications such as Chatterjee (1940), Joseph (1977), Henry *et al.* (1979), Jain & Sasstry (1984), Ahmedullah & Nayar (1987), Nayar (1996, 1997), Nayar & Sasstry (1987, 1988, 1990), Sastry & Sharma (1991), Nayar & Geevarghese (1993) etc, were referred to learn the distributional and endemic aspects of the species.

Results and Discussion

a. Floristic analysis

During this study, 669 taxa (661 species and 8 infraspecific taxa) of flowering plants belonging to 369 genera under 110 families could be collected. Dicotyledons were represented by 536 taxa (529 species and 7 infraspecific taxa) belonging to 295 genera under 94 families. Monocotyledons were represented by 133 taxa (132 species and 1 variety) in 74 genera under 16 families. Among the total of 669 taxa, there were 14 subspecies and 41 varieties. In the case of pteridophytes, there were 93 taxa (92 species) belonging to 48 genera under 25 families. In total there were 3 varieties also (Kishore, 2004; Kishore & Sasidharan, 2012) (See Table 1).

Table 1: Preliminary information regarding the floristic analysis

No	Plant Groups	Family	Genera	Taxa	Species	Sub- Species	Variety
A	Angiosperms	110	369	669	661	14	41
1.	Dicots	94	295	536	529	14	37
2.	Monocots	16	74	133	132	0	4
B	Pteridophytes	25	48	93	92	0	3
Total		135	417	762	753	14	44

Among the dicots, *Asteraceae* with 50 taxa belonging to 29 genera is the largest family. It is followed by *Fabaceae* (42/22), *Rubiaceae* (36/17), *Acanthaceae* (26/7), *Lamiaceae* (24/10) etc. Among the monocots, *Orchidaceae* with 37 taxa under 20 families is the largest family. It is followed by *Poaceae* (35/26), *Cyperaceae* (19/8), *Commelinaceae* (9/3), *Araceae* (7/1), *Juncaceae* (5/1) etc. When the South Indian flora is considered, *Fabaceae* holds the prime position in dominance followed by *Poaceae* and *Rubiaceae* (Gamble, 1915). But in this study, these families held the second, fifth and fourth positions respectively, while *Asteraceae*, which holds the seventh position in South Indian, flora stands first here.

When the tree species alone are considered, *Lauraceae* with 23 taxa under 9 genera is the largest. It is followed by *Rubiaceae* (15/7), *Euphorbiaceae* (10/7), *Symplocaceae* (10/1), *Myrtaceae* (9/4), *Myrsinaceae* (7/4), etc. The relative dominance of these families, which constitute the tree flora, is the case prevailing in all shola regions. But the undergrowth flora shows a different picture as indicated by the earlier figures. In this study, only the shola vegetation was given much importance. The dominance figures would have changed if the grassland vegetation was also given equal importance.

Among the pteridophytes, *Aspleniaceae* with 12 taxa under 1 genus is the largest. It is followed by *Polypodiaceae* (8/5), *Dryopteridaceae* (9/3), *Lycopodiaceae* (8/3), *Thelypteridaceae* (7/5), *Athyriaceae* (6/4) etc.

It was understood that many of these species were ethnobotanically important and several such information were unknown to the scientific world also (Kumar *et al.*, 1999, 2000; Kumar & Sasidharan, 2002).

b. Distribution of the species

It is understood from the figures that more than 30 percent of the plants are restricted to Western Ghats (Table 2). About 16 percent of plants are common to South India and Srilanka. Indo-Malesian species constitute about 8 percentage. About 3 percentage of plants are of Southeast Asian distribution. Out of the total number of 669 angiosperm taxa, 32 (4.8 %) are exotics.

Table 2: Pattern and percentage of geographical distribution of Angiosperm taxa

No	Distribution	Dicots	Monocots	Total	Percentage
1.	South India	31	7	38	5.68
2.	Western Ghats	43	5	48	7.18
3.	Southern Western Ghats	131	28	159	23.77
4.	Western Ghats & Srilanka	5	0	5	0.75
5.	South India & Srilanka	78	34	112	16.74
6.	Kerala	1	0	1	0.15
7.	India	10	1	11	1.64
8.	Indo-Malesia	48	7	55	8.22
9.	India & Himalayas	5	1	6	0.90
10.	South East Asia	15	3	18	2.69
11.	Exotic	32	0	32	4.78
12.	Others	129	46	175	26.16
13.	Unidentified taxa	8	1	9	1.35
	TOTAL	536	133	669	100

Some of these are introduced ornamentals escaped from the gardens or mere weeds (*Acanthospermum hispidum*, *Ageratina adenophora*, *Ageratum houstonianum*, *Calceolaria gracilis*, *Desmodium uncinatum*, *Erigeron karvinskianus*, *Galinsoga parviflora*, *Gamochoaeata coarctata*, *Lantana camara*, *Oenothera laciniata*, *Parthenium hysterophorus*, *Chenopodium ambrosioides* etc). The introduction of exotic fodder grasses by the State Livestock Development Board has resulted in the influx of the seeds of several other herbaceous plants also, which have now naturalised in the wild. Some introduced and widely cultivated trees have also entered into sholas (*Acacia dealbata*, *A. mearnsii*, *A. dealbata*, *Eucalyptus globulus*, *E. grandis*, *Grevillea robusta* etc). Several introduced vegetables such as *Cyphomandra betacea*, *Lycopersicon lycopersicum*, *Passiflora edulis*, *P. ligularis*, *P. mollissima*, etc. are also now seen growing in low altitude shola regions. The role of birds, animals and man in the dispersal of the seeds of these species is noteworthy.

c. Endemism

In India, there are about 5725 endemic taxa of angiosperms, which represent 33.5 % of Indian flora (17,000 species). They are located in mainly the 'hotspots' (Nayar, 1996). 'Anamalai-High Ranges' where most part of this study is concentrated is one among these hotspots. Ahmedullah & Nayar (1987) have reported that there are 1,923 taxa of flowering plants endemic to Peninsular India. Out of the estimated 4,800 species of flowering plants in Kerala, 1272 (22.6 % of Indian endemics) are endemic to the Southern Western Ghats (Nayar, 1996). These endemic flora belong to a paleotropic one, a part of the peninsular Indian endemic flora of Gondwanaland origin.

Kerala is the natural habitat of about 120 taxa of *paleoendemic* angiosperms belonging to 75 genera and 40 families. This number excludes *neoendemic* species and also those endemic taxa of Western Ghats/Peninsular India, which also occur in Kerala. Together with the Western Ghats/ Peninsular Indian endemics and Kerala endemics, endemism of the flora of our state is very high.

The importance of shola forests in this regard which are considered, as the megacentres of endemism becomes evident (Basha & Nair, 1991; Nair & Basha, 1995). This is evidenced from the present study also. Out of the total 669 angiosperm taxa, 246 (36.8 %) are endemics. This ratio is very high, when compared with the scenario of the country (only 33.5 %). Out of this, 206 taxa (30.7 %) belong to dicots, while monocots constitute only 40 taxa (5.97 %). Among the pteridophytes, out of the 93 taxa, only 6 taxa (6.5 %) are found to be endemic. This indicates that pteridophytes often have a wide range of (cosmopolitan) distribution (Table 3).

Table 3: Categorisation of the taxa into various distributional/conservational statuses

No	Plant groups	Total Taxa	Endemics	Rare	Endangered /Threatened	Possibly extinct
A	Angiosperms	669	246	111	20	7
1.	Dicots	536	206	78	15	5
2.	Monocots	133	40	33	5	2
B	Pteridophytes	93	6	34	8	0
Total		762	252	145	28	7

A list of the Peninsular Indian endemic genera (6 nos.) reported from the shola forests is given as Table 4. This includes *Campbellia*, *Diplocentrum*, *Helicanthes*, *Nilgirianthus*, *Phlebophyllum* and *Vanasushava*. Among these, *Nilgirianthus* and *Phlebophyllum* are now treated under *Strobilanthes*. Genera such as *Arisaema*, *Hedyotis*, *Impatiens*, *Strobilanthes*, *Ophiorrhiza* and *Vernonia* are represented by more than 3 endemic species in Kerala, many of which are reported from the shola forests only.

Table 4: List of the Endemic genera* and the species reported from the sholas

No	Name of the genera	Family	Name of the species	Present nomenclature
1.	<i>Campbellia</i> Wight	Orobanchaceae	<i>C. cytinooides</i> Wight	<i>Christisonia neilgherrica</i> Gardner
2.	<i>Diplocentrum</i> Lindl.	Orchidaceae	<i>D. recurvum</i> Lindl.	(no change)
3.	<i>Helicanthes</i> Danser	Loranthaceae	<i>H. elastica</i> (Desr.) Danser	(no change)
4.	<i>Nilgirianthus</i> Bremek. #	Acanthaceae	<i>N. foliosus</i> (Wight) Bremek.	<i>Strobilanthes foliosus</i> T. Anders.
		Acanthaceae	<i>N. neilgherrensis</i> (Bedd.) Bremek.	<i>Strobilanthes neilgherrensis</i> Bedd.
		Acanthaceae	<i>N. papillosus</i> (T. Anders.) Bremek.	<i>Strobilanthes papillosus</i> T. Anders.
		Acanthaceae	<i>N. perrottetianus</i> (Nees) Bremek.	<i>Strobilanthes perrottetianus</i> Nees
		Acanthaceae	<i>N. urceolaris</i> (Gamble) Bremek.	<i>Strobilanthes urceolaris</i> Gamble
		Acanthaceae	<i>N. wightianus</i> (Nees) Bremek.	<i>Strobilanthes wightianus</i> Nees
5.	<i>Phlebophyllum</i> Nees #	Acanthaceae	<i>P. kunthianum</i> Nees	<i>Strobilanthes kunthianus</i> (Nees) T. Anders. ex Benth.
6.	<i>Vanasushava</i> Mukh. & Constance	Apiaceae	<i>V. pedata</i> (Wight) Mukh. & Constance	(no change)

(* Ref.: Ahmedullah & Nayar, 1997; # now treated under *Strobilanthes*)

Among the dicots, majority of the South Indian endemics (6 taxa) belong the family *Lamiaceae*, while *Asteraceae* (7 taxa) and *Rubiaceae* (21 taxa) have the highest number taxa as Western Ghats and Southern Western Ghats endemics. Out of the total number of 23 *Impatiens* reported, 18 (73 %) are endemics (14 species are Southern Western Ghats endemics and 4 are Western Ghats endemics). Similarly, out of the total number of 19 *Strobilanthes* reported, 16 (84 %) are endemics (15 are Southern Western Ghats endemics and one is Western Ghat endemic).

Among the *Rubiaceae*, all the species of *Hedyotis* (4), *Lasianthus* (5) and *Psychotria* (3) are S. W. Ghat endemics. Same is the case with all the species of *Actinodaphne* (3) and *Cinnamomum* (6) of *Lauraceae*. In the case of monocots, out of the 37 *Orchidaceae* members, 13 (35 %) are S. W. Ghats endemics and 5 are South Indian endemics. Among the 7 *Arisaema* (*Araceae*) collected, 5 are S. W. Ghats endemics and one is W. Ghats endemic.

Among the pteridophytes, *Elaphoglossum*, *Psuedocyclosorus*, *Sphaeropteris* (earlier name *Cyathea*) and *Gleichenia* coming under *Lomariopsidaceae*, *Thelypteridaceae*, *Cyatheaceae* and *Gleicheniaceae* are the four genera, which have representation of endemic taxa.

d. Plants under different threat categories

Joseph (1977), Henry *et al* (1979), Jain & Sastry (1984), Ahmedullah & Nayar (1987) and Nayar & Sastry (1987, 1988, 1990) have well documented the rare and threatened plants of South India. Nayar (1997) listed out 1272 endemic taxa in Kerala and 460 of them are placed under threat categories. Since sholas are centers of endemism, with more than one third (39.3 %) of the taxa being endemic as evidenced from the present study, chances of local extinction of species is far great. The habitat destruction and other anthropological activities have speeded up this process. So the figures of rare and threatened plants as documented in the above works are always not dependable, since majority of these works are based on secondary data or those based on the earlier herbarium collections. Thorough field investigation studies are necessary to validate many of this information.

It is a fact that a lot of other species, which are not reported in the works cited earlier, are found locally in very rare and threatened conditions. Since sholas are facing several threats, documentation of such information deserves attention in the conservation point of view. Because many of such locally endangered taxa may face extinction, if proper conservational measures are not taken up.

e. Rediscovery of plants categorized as 'Possibly extinct'

During the study seven species of angiosperms (all dicots), earlier documented as 'Possibly extinct' could be rediscovered (Kumar & Sasidharan, 2010; Kumar, 2012). *Actinodaphne bourneae* could not be collected during this century and was considered extinct (Nayar, 1997). This species could be collected from the Anamudi slope of Eravikulam National Park (Table 5).

Table 5: 'Possibly extinct'* plants rediscovered during the study

No.	Name of the species	Habit	Family	References
1.	<i>Actinodaphne bourneae</i> Gamble	Tree	Lauraceae	Nayar, 1997
2.	<i>Arisaema attenuatum</i> Barnes & C.E.C. Fisch.	Herb	Araceae	Shetty & Vivekananthan, 1991; Nair & Basha, 1995
3.	<i>Arisaema psittacus</i> Barnes	Herb	Araceae	Shetty & Vivekananthan, 1991; Nair & Basha, 1995

4.	<i>Impatiens anaimudica</i> C.E.C. Fisch.	Herb	Balsaminaceae	Nayar & Sastry, 1988
5.	<i>Impatiens platyadena</i> C.E.C. Fisch.	Herb	Balsaminaceae	Ahmedullah & Nayar, 1987; Hajra <i>et al.</i> , 1997
6.	<i>Pimpinella pulneyensis</i> Gamble	Herb	Apiaceae	Nayar, 1997; Matthew, 1999
7.	<i>Symplocos monantha</i> Wight	Tree	Symplocaceae	Nayar, 1997

Arisaema attenuatum and *A. psittacus* were treated as 'possibly extinct' by Shetty & Vivekananthan (1991). *A. attenuatum* could be collected from the Chengalar dam region at Mannavan Shola and also from the Umayamala valleys (MPCA plots) at Eravikulam. This species is occasionally found in the shola borders or scrublands. *A. psittacus* is a threatened, narrow endemic species which could not be relocated after the type collection by Barnes in 1937 from Chunduvurrai & Mannavan Shola. It was so considered extinct in its natural habitat. However the species was recently rediscovered from the same localities by Nair *et al.* (1997). I could collect the species from both these locations and also from another locality named Pambadam Shola, which is situated nearby.

Impatiens anaimudica was considered as 'possibly extinct' by Nayar & Sastry (1988), since it was not collected after the type collection by Barnes (1933) from Anamudi. I could collect this species during October 1996 from the Umayamala ranges of Eravikulam. Biju (2001) also relocated this species from Anamudi. *Impatiens platyadena* was considered as 'possibly extinct' by Ahmedullah & Nayar (1987) and Hajra *et al.* (1997). It was Barnes who made the type collection from the Nyamakad gap of Idukki District during 1933 and after that it could not be collected. The species was collected from the Nilagiri teri region of Eravikulam. *Pimpinella pulneyensis* was so far reported from its type locality (Palni hills) only and was considered 'possibly extinct' (Nayar, 1997; Matthew, 1999). Present collection from Idlimottai region of Mannavan Shola thus forms both a rediscovery and extension of distribution of the species to Kerala. *Symplocos monantha* was also considered extinct by Nayar (1997) since it could not be relocated after the type collection, which was made from the Shevagherry Hills of Tamil Nadu by Robert Wight, until it was reported from Periyar Tiger Reserve recently (Sasidharan, 1998). Present collection from the Idlimottai regions of Mannavan Shola extends the distribution of the species.

f. New records

About 70 plants were reported for the first time from Kerala as a result of this study (Kumar, 1997; Kumar *et al.* 1997; Rajesh & Kumar, 2003; Kumar & Sasidharan, 2010; Kumar, 2012). This include 55 angiosperms and 15 pteridophytes. These figures form about 8.2 % of the total angiosperms collected (669 taxa) and 16 % of the total pteridophytes collected (93 taxa), which is a substantially high figure. Among these, three are rediscoveries of plants considered as 'possibly extinct' (*Actinodaphne bourneae*, *Pimpinella pulneyensis* and *Symplocos monantha*), while one is a new record to the country (*Oenothera laciniata* – Onagraceae) (See Kumar, 2012).

g. Diversity of Pteridophytes

The total number of 93 pteridophytes collected from the shola regions of Kerala forms 28.1 % of the total pteridophyte flora of the state (331 species: Easa, 2003). The significance of this figure becomes clear when we compare the area of shola forests with that of Kerala as a whole. We have earlier seen that Shola forests

occupy only about 70 sq. km area, while Kerala as a whole occupy 38,863 sq. km of land, with about 9400 sq. km area under forests (Nair, 1997). It is quite interesting to see that shola forests which form only less than one percentage (0.7 %) of the total forested land of Kerala (0.2 % of the whole area of the State), is supporting 28.1 % of the pteridophytes of the state. The present figure also forms 54 % of the total collections made from the Malabar region by Nayar & Geevarghese (1993).

Very rare and interesting tree ferns, which are considered as '*fossil plants*', are found to grow only in the shola forests, where they are facing several threats of destruction (Kumar, 1999). The need for conserving the shola forests, which acts as a refugium of pteridophyte diversity, becomes evident here.

Conclusions

From the study it is becoming clear that sholas are one of the most diverse ecosystems in the Western Ghats, which is considered as one of the 'hottest' of the hotspots of biodiversity. The total of 669 angiosperm taxa collected from a small area certainly indicates the high diversity prevailing in these regions. The 93 taxa of pteridophytes which contribute about 28.1 % of the total flora of the state, collected from such a small area also signifies the high pteridophyte diversity of the region. Out of the total of 669 angiosperm taxa collected, 246 (36.8 %) belong to endemics. These figures substantiates the general view that sholas as megacentres of endemism. Perhaps the unique altitudinal and climatic factors, which favour diverse microclimatic situations, might be leading to the high endemic concentration and diversity in these regions.

A number of plants belonging to various threat categories could be located during this study. About 70 plants including 15 pteridophytes could be reported for the first time from Kerala. Seven plants, which were considered as 'possibly extinct', could also be rediscovered. Thorough explorations in the area may lead to the discovery of more new taxa, since many of the regions remain still unexplored due to inaccessibility and hostile environments.

Therefore in short, the sholas, which are floristically unique in all respects, have to be protected and explored thoroughly to elucidate the floral diversity and status of the endemics, before they get extinct due to degradation, depletion or conversion of natural vegetation.

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DO'S AND DON'TS OF E-SHOPPING

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The internet has revolutionised the way we live our lives - enabling us to read the news, enjoy entertainment, carry out research, book our holidays, buy and sell, shop, network, learn, bank and carry out many other everyday tasks.

If you're like most people who use the Internet, you will probably purchase something online within the next month or two. And why not? You have so many choices, with a world of products at your fingertips, and you don't have to waste gas or deal with parking hassles, mall crowds, and long lines. Perhaps the best thing about shopping online is that you can do it barefoot in the comfort of your home. Unfortunately, there are some drawbacks to shopping online.

Many consumers are rightfully concerned about providing their financial information, such as credit card numbers, online. How do you know which Web sites are safe to transact with and which ones are not? How can you avoid problems when you purchase online?

If you want to be a savvy online shopper, enjoy finding great deals, and avoid becoming a victim of cybercrime, you just need to follow a few basic DO's and Don'ts when buying from Web sites.

The objectives of this presentation are

- a) To create awareness among the people regarding online shopping and
- b) To understand the do's and don'ts of online shopping

DO: Shop at home

Wireless networks have revolutionised the way we can use computers and mobile devices, both in the home and office - and when we are out and about. Home and office wireless networks make it easier to use the internet and send and receive email in any room in the building and even outside... and enable visitors to do likewise. 'Public' wireless networks or hotspots mean that we can do the same in places like cafés, hotels and pubs. Never make purchases online using a public Wi-Fi connection. Hackers can tap into Wi-Fi connections at hot spots, such as coffee shops, airports and hotels, to capture your personal information. Also, never use a public computer to shop or check accounts online. The above risks can be avoided simply by ensuring that the wireless hub/router/dongle that you wish to connect to, is secured.

When you first connect a computer, [smartphone](#), tablet, printer or any other wireless-enabled device to any wireless hub/router/dongle, you will be prompted to enter a password/key, provided the network is in secure mode. This will enable the device to connect on this occasion and normally, for future use. The password/key will be supplied with the hub/router/dongle, but you may be given the opportunity to change it to one of your own choice.

If you are setting up a new hub/router/dongle, it will probably have been supplied with security turned on as the default. There are three main encryption levels available (WEP, WPA and WPA2), WPA2 being the highest. Most hubs/routers give you the option of selecting a higher level, but remember that some older devices may not be compatible with higher levels.

If for any reason a home/office/mobile wireless hub/router/dongle you wish to connect to is not secured, consult the user manual.

Ensure you have effective and updated antivirus/antispymware software and [firewall](#) running before you connect to a wireless network.

Keep [WiFi](#) codes safe so that others cannot access or use them. The security risk associated with using public [WiFi](#) is that unauthorised people can intercept anything you are doing online. This could include capturing your passwords and reading private emails. This can happen if the connection between your device and the [WiFi](#) is not encrypted, or if someone creates a spoof hotspot which fools you into thinking that it is the legitimate one.

With an encrypted connection, you will be required to enter a 'key', which may look something like: 1A648C9FE2.

Alternatively, you may simply be prompted to log in to enable internet access. This will tell the operator that you are online in their café, hotel or pub. There is almost certainly no security through encryption.

Safe Public WiFi

Unless you are using a secure web page, do not send or receive private information when using public WiFi.

Wherever possible, use well-known, commercial hotspot providers such as BT OpenZone or T-Mobile.

Businesspeople wishing to access their corporate network should use a secure, encrypted Virtual Private Network (VPN).

Ensure you have effective and updated antivirus/antispymware software and firewall running before you use public [WiFi](#).

Other Advice

Don't leave your computer, smartphone or tablet unattended.

Be aware of who is around you and may be watching what you are doing online.

Do Verify the Site Is Secure

Before you type in your credit card information, you should take time to research the Web site. Start with making sure the Web site has a trust mark like McAfee SECURE, which means that the Web site is secure for shopping. Also, consider contacting the seller if this is your first purchase. Most reputable e-sellers will have a toll-free customer service phone number. If the site has only an email address and no phone number, start an email or instant message dialogue with the people running the site before you buy anything from them. Keep all passwords private. Never give out your Social Security Number. Read site's privacy and security policy

Being wary of malicious, criminal or inappropriate websites:

Use your instincts and common sense.

Check for presence of an address, phone number and/or email contact – often indications that the website is genuine. If in doubt, send an email or call to establish authenticity.

Check that the website's address seems to be genuine by looking for misspellings, extra words, characters or numbers or a completely different name from that you would expect the business to have.

Roll your mouse pointer over a link to reveal its true destination, displayed in the bottom left corner of your browser. Beware if this is different from what is displayed in the text of the link from either another website or an email.

If there is NO padlock in the browser window or 'https://' at the beginning of the web address to signify that it is using a secure link, do not enter personal information on the site.

Websites which request more personal information than you would normally expect to give, such as user name, password or other security details IN FULL, are probably malicious.

Avoid 'pharming' by checking the address in your browser's address bar after you arrive at a website to make sure it matches the address you typed. This will avoid ending up at a fake site even though you entered the address for the authentic one – for example 'eebay' instead of 'ebay'.

Always get professional advice before making investment decisions. Sites that hype investments for fast or high return – whether in shares or alleged rarities like old wine, whisky or property – are often fraudulent.

Be wary of websites which promote schemes that involve the recruitment of others, receiving money for other people or advance payments.

If you are suspicious of a website, carry out a web search to see if you can find out whether or not it is fraudulent.

Be wary of websites that are advertised in unsolicited emails from strangers.

Secure Websites

Before entering private information such as passwords or credit card details on a website, you can ensure that the link is secure in two ways:

There should be a padlock symbol in the browser window frame that appears when you attempt to log in or register. Be sure that the padlock is not on the page itself ... this will probably indicate a fraudulent site.

The web address should begin with 'https://'. The 's' stands for 'secure'.

The above indicate that the website owners have a digital certificate that has been issued by a trusted third party, such as VeriSign or Thawte, which indicates that the information transmitted

online from that website has been encrypted and protected from being intercepted and stolen by third parties.

When using websites that you do not know, look for an Extended Validation (or EV-SSL) certificate, which indicates that the issuing authority has conducted thorough checks into the website owner. The type of certificate held can be determined by clicking the padlock symbol in the browser frame which will launch a pop-up containing the details.

Do also note that the padlock symbol does not indicate the merchant's business ethics or IT security.

Ensure you have effective and updated antivirus/antispyware software and firewall running before you go online.

Do put a pin on it

Names, addresses, phone numbers and credit card numbers are legitimate information for sites to ask for, but you should never give out your social security number, bank routing numbers or driver's license number.

Our passwords are the most common way to prove your identity when using websites, email accounts and your computer itself (via User Accounts). The use of strong passwords is therefore essential in order to protect your security and identity. The best security in the world is useless if a malicious person has a legitimate user name and password.

Get started...

Always use a password.

Ensure you use strong passwords, and do not disclose them to anyone else.

Passwords are commonly used in conjunction with your [username](#). However, on secure sites they may also be used alongside other methods of identification such as a separate [PIN](#) and/or memorable information. In some cases you will also be asked to enter only certain characters of your password, for additional security.

The Risk of Using Weak Passwords

People impersonating you to commit fraud and other crimes, including

Accessing your bank account

Purchasing items online with your money

Impersonating you on social networking and dating sites

Sending emails in your name

Accessing the private information held on your computer

Choosing the Best Passwords

Do:

Always use a password.

Choose a password with a combination of upper and lower case letters, numbers and keyboard symbols such as @ # \$ % ^ & * () _ +. (for example SP1D3Rm@n - a variation of spiderman, with

letters, numbers, upper and lower case). However, be aware that some of these punctuation marks may be difficult to enter on foreign keyboards.

Choose a password containing at least eight characters. However, longer passwords are harder for criminals to guess or break.

Don't:

Use the following as passwords:

Your [username](#), actual name or business name.

Family members' or pets' names.

Your or family birthdays.

Favourite football or F1 team or other words easy to work out with a little background knowledge.

The word 'password'.

Numerical sequences.

A commonplace dictionary word, which could be cracked by common hacking programs.

When choosing numerical passcodes or PINs, do not use ascending or descending numbers (for example 4321 or 12345), duplicated numbers (such as 1111) or easily recognisable keypad patterns (such as 14789 or 2580).

Looking After Your Passwords

Never disclose your passwords to anyone else. If you think that someone else knows your password, change it immediately.

Don't enter your password when others can see what you are typing.

Change your passwords regularly.

Use a different password for every website. If you have only one password, a criminal simply has to break it to gain access to everything.

Don't recycle passwords (for example password2, password3).

If you must write passwords down in order to remember them, make sure they are meaningless to, and unusable by other people by writing them in code (substituting the characters in your password with others that you can remember, or easily work out).

Do not send your password by email. No reputable firm will ask you to do this

DO BID SMARTLY

Online auction sites are a highly popular way of buying and selling both new and second hand goods. There are, however, risks associated with using auction sites – some of which are different from normal online shopping. Therefore you need to take care with what you are buying and from whom, who you are selling to, and how you pay for your purchases or get paid for items you are selling.

Get started...

Choose reputable sellers and buyers.

When selling, ensure that payment has been received before you despatch the goods.

Ensure the payment website is authentic and secure before entering payment details.

The Risks

Bogus stores/shops – fake websites and email offers for goods and services that do not exist.

Receiving goods which do not match the advertiser's description.

Not receiving goods which you have paid for.

Not receiving payment for goods which you have despatched.

Being persuaded into selling early or at a low price. The best bids usually come towards the end of the auction period.

Having your auction identity stolen and used fraudulently.

Having your personal/financial information stolen and used fraudulently.

Phishing emails, appearing to be from a auction or online payment sites but actually from criminals trying to lure you to a fake website to get your personal information such as login details for your online payment account.

Use Online Auctions Safely

If you are new to online auctions, take the time to read the online guides provided by the auction company so you understand how the system works and what the rules are.

Understand what the auction company can do (and won't do) if something goes wrong.

Use a login name for the auction site that is different from your email address.

Keep your contact information including email address, up to date.

Look into the seller or buyer - whether a private individual or online store. Look at their profile, their rating and transaction history. New sellers and buyers may not have a very comprehensive history, so be a little more cautious.

If the seller is a business, check their real-world existence. If they provide a phone number or address, give them a call. Sellers outside the UK may be harder to chase in the event of a problem.

Check online stores' privacy and returns policies.

Be clear about shipping and delivery costs (for example, whether or not they are included and if not, if they are clearly stated).

Be clear about methods of payment and whether any of these incur a surcharge.

Provide only the minimum necessary personal information to sellers and buyers, such as your address for collection or despatch purposes.

Double check all details of your purchase before confirming payment.

Check that notifications of communications between yourself and your buyer or seller are not being blocked by spam filters, by regularly checking your spam folder.

Do not fall for requests to close auctions early.

Always make sure you have received payment before despatching goods.

When making a payment to an individual, never transfer the money directly into their bank account but use a secure payment site such as PayPal, where money is transferred between two electronic accounts.

And always remember...

Use strong passwords. Never reveal your auction or online payment passwords to anybody.

If you think that your auction or online payment account has been compromised, take action immediately. Check the site's online help page.

Be wary about clicking on links provided in unsolicited emails. For example, it is better to enter your bank's website address into your browser directly, or use a bookmark that you created using the correct address.

If you pay by payment card, remember that a credit card offers greater protection than with other methods in terms of fraud, guarantees and non-delivery.

When paying either by online payment service or payment card, ensure that the link is secure, in three ways:

There should be a padlock symbol in the browser window frame, which appears when you attempt to log in or register. Be sure that the padlock is not on the page itself ... this will probably indicate a fraudulent site.

The web address should begin with 'https://'. The 's' stands for 'secure'.

If using the latest version of your browser, the address bar or the name of the site owner will turn green.

Always log out of sites into which you have logged in or registered details. Simply closing your browser is not enough to ensure privacy.

Keep receipts.

Check credit card and bank statements carefully after shopping to ensure that the correct amount has been debited, and also that no fraud has taken place as a result of the transaction.

Ensure you have effective and updated antivirus/antispymware software and firewall running before you go online.

Don't buy from spammers

Email is both an excellent communication tool and also a way that companies can inform you about their latest products and services. However, email is frequently used to deliver unwanted material which is at best, annoying and at worst, malicious – causing considerable harm to your computer and yourself.

These include the following:

Spam (or Junk) email

Get started...

Always be vigilant when receiving or responding to emails.

Make sure your spam filter is always switched on to minimise the risks.

Use email safely

Do not open emails which you suspect as being spam.

Do not forward emails which you suspect as being spam.

Do not open attachments from unknown sources.

Do not readily click on links in emails from unknown sources. Instead, roll your mouse pointer over the link to reveal its true destination, displayed in the bottom left corner of your screen. Beware if this is different from what is displayed in the text of the link from the email.

Do not respond to emails from unknown sources.

Do not make purchases or charity donations in response to spam email.

Don't click on 'remove' or reply to unwanted email.

Check junk mail folders regularly in case a legitimate email gets through by mistake.

When sending emails to multiple recipients, list their addresses in the 'BCC' (blind copy) box instead of in the 'To' box. In this way, no recipient will see the names of the others, and if their addresses fall into the wrong hands there will be less chance of you or anybody else receiving phishing or spam emails.

Similarly, delete all addresses of previous parties in the email string, before forwarding or replying.

If you are suspicious of an email, you can check if it is on a list of known spam and scam emails that some internet security vendors such as McAfee and Symantec feature on their websites.

Most Microsoft and other email clients come with spam filtering as standard. Ensure yours is switched on.

Most spam and junk filters can be set to allow email to be received from trusted sources, and blocked from untrusted sources.

When choosing a webmail account such as gmail, Hotmail and Yahoo! Mail, make sure you select one that includes spam filtering and that it remains switched on.

Most internet security packages include spam blocking. Ensure that yours is up to date and has this feature switched on.

Are you scammed recently by a nigerian email scammer, or blackmailed or have come through any online fraud recently? Its time to report to the Indian Cyber Crime department via their newly launched toll-free number and get the accused punished for their wrong acts.

Indian Cyber Crime Phone Number : 1800 209 6789

You can report with the Cyber Crime department if you have a case which is related to Cyber stalking, cyber harassment, Online harassment, unsolicited calls, pornographic MMS, online fraud, phishing, or even threat mails. You can also get professional assistance regarding any of the above crimes for free at the above mentioned toll free number in order to help online internet users.

CONTACT

Contact with your Companies Details/Information, Query and Legal Help Details to =
[info@cyberlawsindia\(.\)net](mailto:info@cyberlawsindia(.)net) (Remove Brackets)

Phone: +919571614198

DON'T: Wire money to pay for an item. If you purchase an item from an online auction site, such as eBay, and the seller asks you to wire your payment, don't do it. says wiring money is inviting yourself to a fraud situation -- you have no way to get your money back if the item you purchase never arrives. Pay with a credit card so you can dispute the charges if you don't get what you paid for. Make sure you use a credit card when making purchases online. If a hacker steals your debit card information and uses it to make unauthorized purchases. When you pay with credit cards, you can easily dispute fraudulent charges, and, by law, your liability is limited. When you pay with debit cards, the money comes directly out of your account. Getting the cash back can be difficult, if not impossible. When you pay by cash or use a wire transfer, the money goes directly into the seller's account, and there is no recourse if something goes wrong.

DON'T: Fall for bogus bargains. If a Web site or individual offers a deal that's too good to be true, demands a direct transfer of funds and won't accept credit cards, it's probably a scam. This sort of offer often appears in unsolicited e-mails. Don't ever click on a link in an unsolicited e-mail to go shopping, even if the e-mail looks as if it came from a legitimate retailer. Shop Smart, and Only at Sites You Know & Trust Avoid search-engine shopping. For the safest online shopping experience, it's best to stick with merchants you know and trust. Most importantly, make sure you have read and understand the merchant's shipping and return policies before making any purchases. Be sure to print a copy of each receipt or confirmation e-mail you receive. Keep all of your receipts in a folder and filed away in a safe place. Never buy anything advertised via unsolicited e-mail. Such offers are almost always a scam.

Don't forget to inspect your new purchase as soon as it arrives. If you find a problem, notify the seller as soon as possible.

Don't Reload Confirmation Pages That Fail to Load

A site may accidentally charge you multiple times if you keep trying to reload a confirmation page. Instead, contact the retailer directly to make sure your order went through.

(Rs.19,683) etc. have figures that are much higher than the national average. Actually, the lowest annual earning of Assam, with its huge proportion of handloom-dependent households, is what pulled down the national average. Again, in the North Eastern states, the share of handloom income to total household income is only 18.8% spread across all handloom households, while it is 58.1% for households in the states of other regions where most of the households work solely for commercial purpose. The share of income generated from handlooms is just 20.9% across all households in Assam, which is below the national share of 30.2%. The reason behind such low earnings from the handloom sector is, as stated earlier, due to the majority of looms being engaged in domestic purposes rather than commercial purposes, and unit productivity is low as compared to other states of India. The Government interventions may focus on organizing the handloom workers into SHGs and encouraging setting up of handloom units of appropriate size which are commercially viable. Besides, Assam has a very large number of handloom units with very low average productivity, so in order to increase production of fabrics on handlooms, innovation and improvisation is necessary and unless the base is sustained and strengthened, its quintessential products cannot be augmented.

The Central government should make Assam, and the entire North Eastern region of India, a focus area for future interventions. The government interventions in the North Eastern states basically focus on group formation, input supply, loom upgrades, cluster development and marketing. The established retail chains should also come forward and collaborate with government agencies to assist in product development and marketing. Banking institutions and other financial institutions should offer to provide adequate credit for such activities.

FLEXIBILISATION OF EMPLOYMENT AND EXTERNALIZATION OF LABOUR RELATIONS: AN EMPIRICAL STUDY IN A SOUTH INDIAN STATE

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The labour market all over the world has witnessed spectacular transformations since the mid 1980s. The policies facilitating high levels of job security, life-long employment and promotion by seniority, which were followed by most of the business corporations, have come under severe attack. In its place, a shift in policies towards the introduction of low security contracts, the erosion of the system of life-long employment and the introduction of performance-linked incentives and promotions has become normative. Comprehensive reports drafted by the IMF and World Bank have highlighted the need for a flexible labour market as a solution to distortions in labour market. In the Indian context, this is manifested on the eve of the implementation of the New Economic Policy of 1991 that is footed on the ideals of Liberalisation, Privatisation and Globalisation. Over the last two decades since we have embraced the economic liberalisation, the labour market has seen new developments

hitherto unheard of in the national industrial scene. The current development debate surrounding the industrial world now discusses concepts like flexibilisation, casualisation, and contractualisation of employment and externalisation of labour relations etc., on a wider scale. Deregulation of labour market and 'flexibilisation' of employment is seen by many as a pre-requisite for reducing rigidities in labour market and enhancing competitive efficiency of firms. "Flexibilisation" refers to the changing work practices by which firms no longer uses internal labour markets, or implicitly promise employees lifetime job security, but rather seeks flexible employment relations that permit them to increase or downsize their workforce, and reassign and re-deploy employees with ease. The increasing number of contractual labour, which forms a larger segment of the flexible labour, raise questions about the plight of this group of workers vis-a-vis rights at work indicators, employment indicators, social protection indicators and social dialogue indicators – factors which form the four pillars of decent work indicators articulated by ILO. In this juncture, this paper investigates the ongoing process of labour market 'flexibilisation' and its consequences for individual labour market in the context of a developing country like India. This paper is primarily an attempt to investigate the extent of flexibilisation of employment in the organized industrial segment of Kerala, a South Indian State known for its unique development model. Using an appropriate research methodology, the study comes to the conclusion that the flexible employment practice in India, which was comparatively low before liberalization, gained momentum during 1990s, and by 2006, 30 per cent of the workers employed in India belonged to this flexible category. The presence of a very strong bastion of leftist political parties and left wing trade unions were to an extent successful in defending flexible employment practices in Kerala. However, the post-liberalisation period witnessed tremendous growth in flexible employment in the state. The percentage of contractual labour in Kerala was as low as 1.9 per cent of total workers employed in the state during 1987-88. Even though it increased to 14.15 per cent during 2006-07, it was still far lower compared to all India figures of 30 per cent. But the overall growth rate in contract labour during 1987-2007 was 87 per cent in Kerala, compared to all India growth rate of 67.7 per cent. The phenomenal growth of flexible labour has posed many challenges to unions, including the weakening of trade unions and the undermining of the collective bargaining process. The study has found significant signs of negative correlation between flexible employment and membership in trade unions, raising serious concerns about the very existence of trade unions. These forms of employment practices, which are used by employers to escape from the cost burden of employing standard workers by paying lower wages, and denying other benefits like health insurance, pension etc., help employers to save on huge overheads at the labour-cost end. Exploitatively low wages are paid to flexible labourers, and they are denied most of the benefits given to regular workers. With the externalization of employment relations, wages are set in external, rather than internal, labour markets, wherein the wages of this category of workers lack upward mobility and are seen to be more unequal. The denial of freedom of association to the contract workers, which may even result in increased tension and conflict at workplace (as has happened in Maruti Suzuki's Manesar plant), points to the

vulnerability of flexible labour vis-à-vis Social Dialogue Indicators. This ranks as one among the four Decent Work Indicators (DWI) of ILO, which shows the extent to which workers can collectively represent their interest and voice concerns in work-related matters. Since the contract labour do not come under the purview of DWI 20, the Collective bargaining coverage, determination of working conditions, terms of employment, and relations between employers and workers are all external to the system, leading to externalization of labour relations. About sixty-six percent of labours in the three sample units belong to the flexible category, implying that the majority of workers fall outside the purview of the collective bargaining process. Increasing segmentation and fragmentation of labour markets and an increase in the magnitude of non-standard forms of employment have had a serious impact on transformations in the economic and social landscape of labour relations. These changes in the labour market have had a sizable impact on defining social and economic inequalities. Labour as a class has been fragmented into groups, where some groups enjoy all the benefits as defined under the Decent Work Indicators, while others are constantly being denied even the basic right to organize and represent their grievances. The quantum jump in the extent of flexible employment at the national and state level is of great concern to trade unions, especially in a state like Kerala, where labour has traditionally been highly organized. Under these circumstances, the plight of organized labour and the future course of developments will depend upon the policies and programmes of the government to address the vulnerabilities faced by this class of workers, and the future course of action taken by trade unions.

LIVELIHOOD OF DIAMOND INDUSTRY WORKERS IN SURAT DISTRICT OF GUJARAT: A FIELD EVIDENCE

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This paper explores certain research questions as: What is the nature of the level of employment and wage rate in the Surat diamond industry? Why labour regulation and practices failure in terms of Surat diamond industry workers. The central motivation of this study lies in exploring the field evidence of diamond industry workers. It argues that although the diamond sector promotes export capacity, the diamond workers are lagging behind in terms of wage rates and employment condition. The issues of employment opportunities and level of wage rate are important because of different types of workers, e.g. skilled-unskilled and regular-contractual workers. A high level of job insecurity, low wages, poor working conditions and vulnerability to exploitation characterise unskilled and contractual workers. The opening up of the economy has brought with it both challenges and opportunity for Indian industry. Surat diamond cutting and polishing industry is one of the most globalised industries in India. Surat diamond industry has played significant role in the economic development of Gujarat.

**OPAQUE COMIC MISCHIEF AND THE RHETORICAL SITUATION IN
MILAN KUNDERA'S *THE ZERT* (THE JOKE)**

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ABSTRACT

Milan Kundera was one of the most talented novelists to emerge from the death throes of the old Communist regimes in Eastern Europe. His novels are not merely political tracts but attempts to discover possible meanings for the existential problems facing all human beings. His first book, 'The Zert' or 'The Joke' published in 1967, exposes the dangers of living in a humorless world and is the work most responsible for Kundera's emergence as a leader in the reform movement that led to the Czech Republic's 1968 Prague Spring. The novel centers round Ludwik Jahn, a disillusioned young communist's joke which backfires with unpleasant consequences whereupon he embarks on a futile act of revenge. 'The Joke' is about unintended results of a single joke that manipulates both the formal and affective qualities of jokes. This paper attempts to examine the jokes which go far beyond the repercussions of Ludwik's postcard that had ignited the series of events. It reveals the disastrous consequences of a joke enacted innocently but received humourlessly. Jokes are formal models in 'The Joke'; as a metaphor they signify a world in which jokes are no longer funny, a world where the humane is inverted.

Though by no means a symbolist work, *The Joke* works well on several levels. The characters are valid both in themselves and as types in contemporary Czechoslovak society. The plot concentrates on their heroes' inner worlds and provides a miniature social history of Czechoslovakia. The meditations on inversion of jokes, guilt and totalitarianism, possibilities for change and the concept of history that underlies the logic of the novel's events are unquestionably areas worthy of attention. His characters are born of history and his characters do act. They are not without agency. Kundera's novel exists somewhere in the midst of this paradox. People have an effect on themselves and the world around them. The problem is that the result of human agency (history) is a joke, and a bad one at that. This paper traces not only how history determines Kundera's characters, but also how his characters shape history by way of the phenomenon of anti-agency. There are many joke like episodes in the novel; though it uses the joke form in reality it is inverting the form's effect, accruing despair and degradation.

The Politics of Proselytism and Overcoming Laws of Patriarchy: A Study of Bama and Dayabai

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Liberation theology is a political movement in Catholic theology which interprets the teachings of Jesus Christ in relation to liberation from unjust economic, political, or social conditions. It is an interpretation of Christian faith through the poor's suffering, their struggle and hope; a critique of society and the Catholic faith and Christianity through the eyes of the poor. It arose principally as a moral reaction to the poverty caused by social injustice. It could be interpreted as a western attempt to return to the gospel of the early church where Christianity is politically and culturally decentralized. Liberation theology proposes to fight poverty by addressing its supposed source: sin. The principal methodological innovation is seeing theology from the perspective of the poor and the oppressed - the poor are a privileged channel of God's grace.

Gustavo Gutierrez gave the movement its paradigmatic expression with his book *A Theology of Liberation* (1971). Drawing from the biblical motif on the poor, he asserts that God is revealed as having a preference for those people who are "insignificant," "marginalized," "unimportant," "needy," "despised" and "defenseless." Preference implies the universality of God's love, which excludes no one. He emphasized practice or "praxis" over doctrine. In liberation theology he declared, the "people" is the antithesis of the hierarchy, the antithesis of all institutions, which are seen as oppressive powers. Ultimately anyone who participates in the class struggle is a member of the "people"; the "Church of the people" becomes the antagonist of the "hierarchical Church." Such criticisms have provoked counter-criticisms that orthodox Catholics are in effect casting the Catholic Church as a friend of authoritarian regimes; and that the Vatican is not so much trying to defend pure doctrine as to maintain an established ecclesiastical and political order.

The struggles of a community to claim equality with the mainstream, has an epic stature, as it requires a great deal of potential to swim against the tide. In India the marginalised sections of society remains still under the subordination of the powerful social groups which hamper their progress. It has led to different forms of protests from such

groups but very often it is silenced by force or by tactics order to ensure the continuity of the privileges enjoyed by the upper class and upper caste mainstream.

The life of an Indian Christian is coloured by several social backgrounds. The process of Proselytism has itself been a topic of debate and the aftermath of it is becoming yet another. Proselytism is the act of attempting to convert people to another religion or opinion. It now refers to the attempt of any religion or religious individuals to convert people to their beliefs, or any attempt to convert people to a different point of view, religious or not. Some Christians define it more narrowly as the attempt to convert people from one Christian tradition to another; those who use the term in this way generally view the practice as illegitimate and in contrast to evangelism, which is converting non-Christians to Christianity.

The powerless forms the majority but the lack of coordination eventually makes them disintegrated and powerless in relation to the powerful minority who raise their voice in unison whenever they are questioned by the rest of their invincible and infallible nature. Hence the protests of the underprivileged is often underrated and suppressed with brutal force. The politicians, police and bureaucracy often takes sides with the powerful gentry and sometimes it is a wonder to observe the religious bodies too becoming an ally of the mainstream society. Thus it requires an equally powerful force to help the margin come to the centre.

The struggle of a woman to free herself and her society is an interesting act to observe. It is always the element of selfless sacrifice which marks such an honourable act. The oppressed one will require tremendous surge of energy to come out of the cocoon of her imposed servitude, to raise her voice for herself and her creed. Man exerts his domination by stretching the cobweb of family, religion, customs, tradition, and social practices; all these tools pointed towards one aim- curbing the freedom of women.

When women try to come up registering their protest against the treacheries of the powerful, she faces several constraints in exerting her individuality. There are different manifestations of powerlessness that cripple her aspirations. It can be seen that family acts as a prison in disguise with the codes of conduct always pointing t one aim- curbing the freedom of women. Within the limits of the four walls she gets freedom which in turn deactivates her enthusiasm and natural instincts to a great extent.

The struggle of women for social justice has given rise to its own liberation theology, frequently known as feminist theology. Feminist theology is a movement found in not only Christianity but also several other religions, to reconsider the traditions, practices, scriptures, and theologies of those religions from a feminist perspective. Some of the goals of feminist theology include increasing the role of women among the clergy and religious authorities, reinterpreting male-dominated imagery and language about God, determining women's place in relation to career and motherhood, and studying images of women in the religion's sacred texts and matriarchal religion.

Christian feminism is an aspect of feminist theology which seeks to advance and understand the equality of men and women morally, socially, spiritually, and in leadership from a Christian perspective. They believe that God does not discriminate on the basis of biologically determined characteristics such as sex and race. Their major issues include

the ordination of women, male dominance in Christian marriage, recognition of equal spiritual and moral abilities, reproductive rights, and the search for a feminine or gender-transcendent divine.

Christian Patriarchy holds that men are to provide and protect and women are to care for the home and the children. This is seen as the divine order for the family. The idea is that the two sexes are equal, but they have different roles to play. Both roles are highly important, and neither sex can fulfill the role of the other. Men and women are simply different. In a nutshell, Christian Patriarchy is the belief that God has ordained a specific family order, and that this family order must be followed. The husband leads, the wife submits, and the children obey. There are two important aspects about Christian Patriarchy. The first is the belief in the importance of male headship or authority, and the second is the belief that men and women have vastly different roles to play. It holds that women must always be under male authority or headship. A woman is never independent of male authority. First, she is under her father's authority, and then under her husband's authority. This obedience is absolute; a woman is only excused from obeying if her male authority orders her to do something illegal and immoral. It fails to recognize the huge diversity within each gender, and pushes people into prescribed slots based on their genitals rather than seeing people as individuals first.

But lately women have dared to come out of this forced imprisonment to speak for her rightful place in history. Most of the times, these voices are silenced vehemently, but at times it succeeds in making some ripples in the social set up and leaving an imprint for the rest of the society to observe and admire. It is truly a heroic act of uplifting one whole community through the continued efforts of a strong willed woman. This paper attempts to explore how two women have found their path to not just individual freedom but a meaning of their life. Both Bama and Dayabai both claim that they have found their way and this paper analyses how they did it.

The lives of Bama and Dayabai are strikingly similar for many reasons. The utmost dedication with which they make interventions for the rest of the marginalized communities is the most outstanding of them all. They are both gifted with a sense of honour which they want to impart to the ones around them who are yet to realize the value of it. Their efforts to empower the multitudes in the midst of protests from the mainstream society is remarkable for the sheer courage these women display to fight it out by themselves. Above all, both of them share a common history of being led by Jesus Christ, closely following His footsteps and not his disciples'. Hence they create history by choosing the revered vocation of a nun and being led by their conviction following their inner voice to come out of the nunnery to the midst of the sheep. The paper maps the politics of this revocation.

Education acts as a scaffold and helps in liberating her soul. But it suggests no remedy for the malicious attacks on her body and hence she faces hazards that are multifarious including assault on her body, soul and freewill. Very few succeed in liberating themselves from the shackles of domestication. As individual status of a woman is always under threat in the Indian scenario, the daring women are most often compelled to ally themselves other organised social structures like NGOs, political parties religious or quasi-religious organisations etc, which points to a bleak fact that a woman has voice and identity only when she associates with the pillars of patriarchy. In their zest to serve, they have to make a

compromise between their personal interests and the ground reality. There are several successful women who lead various organisations from the forefront. It is also evident that they had to put up either a meek identity or a ferocious one to be popular in the public. A woman to retain her identity as herself is almost like a tight rope walk.

From this minuscule minority of dedicated women, two women were selected who are remarkable for the selfless service they have offered to the people around them. Dayabai and Bama are two towering personalities who registered their protests and followed their inner voice only to find peace of mind for themselves and for the community they chose to serve. Dayabai is the adopted name of Mercy Mathew who comes from an upper middle class Christian family in Kerala. In a sublime act of renunciation and self denial (or self assertion), she decides to seek meaning of her being in providing solace to many in the north Indian plains and forests. She adopted the name Dayabai which endeared her to these people to whom she went with the gospel of empowerment. *Pachaviral* is the autobiography of Dayabai and it is subtitled as the autobiography of Dayabai who reached the subaltern soil from the interiors of a convent (Kanya Madhathil Ninnu Keezhala Mannilethiya Dayabaiyude Atmakatha). As it proclaims, it scans her life in the middle of the subaltern subjects which had its commencement from within the four walls of a convent.

Bama is an acclaimed writer in Tamil known for her stark portrayal of her community life in the midst of ill-treatment and poverty. She talks for her clan speaks for them and lives with them. As a woman with will power she tries to expose the biases of the powerful upper caste against the powerless lower caste Christians and especially their women folk. Strikingly enough Bama too finds out her vocation while being in a convent, which was run by, for and of the upper caste, middle class clerics. *Karukku* is the result of soul searching that she undertakes with a view to liberate her community from the depths of illegitimacy within the Christian domain. Being born into a lower class, Dalit Christian background, she has the perennial torment of hiding her Dalit background which she finds as the most difficult task as it leads to the ultimate negation of her very self. Thus she confronts this inner battle of hide and seek for several years only to be subdued by her powerful spirit, which will not yield to any form of subjugation of herself and her community.

Bama stands for the Dalits in general and the Dalit Christians in particular while all the efforts of Dayabai is directed for the empowerment of Dalits or Tribals in the remote forests of Jharkhand. Both sacrificed their lives to liberate the hapless ones while themselves being led by the Master. They have in the meanwhile derided the law of the patriarch and unearthed or retrieved the law of the Shepherd! This paper clinically examines the entailing processes involved in the process. As their expectations of a convent did not match with the existing living standards of it (as it was beyond their expectation), they decide to quit and come to the 'real' human beings whom they wanted to serve. Bama was by then a full time nun but Dayabai did not graduate out of it. Both came to the conclusion that there exists a great deal of differences between what they preach and what they practice. Thus when the realisation dawned on them they took the bold decision to follow His words and deeds intact by serving the poorest of the poor and set out for their holy vocation.

The Christian church is one of the most organised religious bodies of the world with the Pope at the centre leading the multitudes of believers all over the world. The institution of

church runs into several tiers with the Holy Father acting as its head and its existence is on the concept of priesthood. Its strict adherence to the three vows of chastity, poverty and obedience with the central idea of celibacy is the common characteristics found among various denominations of Catholic Church. The lives of clergy within the seminaries and convents were clearly laid down and were almost similar with minimal differences among the congregations. The celibates enjoy a well protected life within the church and have the freedom to take up various professions as per their aptitude. Still one finds many souls seeking liberation.

Dayabai and Bama register their protest in varying degrees. In *Pachaviral* there is the moment of realisation expressed in these words: ". . . thus I found myself lost in the midst of the superfluity of different dishes of meat and cake which was part of the Christmas celebrations within the Christian convent." (Pachaviral, 32). Bama narrates her experience within the convent thus: "Once inside the convent, it was like coming from the backwoods into a big metropolis!" (Karukku, 21). Their desire to serve the poor ends up in failure and soon they are torn between the rules of the convent and the inner voice that commands liberation. The luxury, pomp and gaiety that they could witness within the convents made them sorrowful.

"The discoveries I made out of books that I read during the school days about the life of a priest and a missionary could not be found out. The missionaries in my thoughts were the ones who ignored the fierceness of rain or shine and shared the distress of the ones in distress." (Pachaviral, 33)

They felt a sickening suffocation on seeing the variety of western dishes spread out on the tables regularly at meal times, with a well set menu for a sumptuous feast was dished. The sight of such extravagant display, the well maintained gardens and lawns created repulsion and aversion in the minds of these two. Finally after great deal of deliberations, they come to the final decision to liberate themselves from the church. It is interesting to note how they find the meaning of liberation by giving preferential option for the poor. Thus these women assert their faith in their Lord.

Dayabai came out of the convent at Hazaribagh on seeing the extent of passivity of the inmates of the convent towards the miseries of the lower classes. The tribal group called Gonds in Madhya Pradesh are one of the most powerful tribal groups in India. Still they are yet to internalise the pace of social change taking place around them. Hence she trains herself to be a teacher cum nurse cum intermediary during various circumstances. She had to meddle with the persons with vested interests who formed a chain of exploiters. The police, the forest officials, the local political leaders and bureaucrats form part of this stretch of the dominant class. There are problems related to illiteracy and poverty and they are further incapacitated by the ignorance of legal procedures. The remoteness of their natural habitat poses another threat for the progress of such communities.

It is important to note yet another theological political theory called Christian communism which like Marxism, also holds that capitalism encourages the negative aspects of human nature, supplanting values such as mercy, kindness, free will, justice and compassion in favour of greed, selfishness and blind ambition. Christian communism is a form of religious communism based on Christianity. They generally do not agree with the antireligious views held by secular Marxists. It is interesting to note with this background

how Dayabai makes interventions to instil the fire of free will among these tribal adopting several measures. She preaches and practices the same thing- the lessons of self reliance and eco friendly approach. These have helped to boost the morale of these under privileged communities to a great extent. Similarly her efforts to empower women through self help groups have liberated many from the cut throat money lenders who often financed the capital for their cultivation. She does all these fighting out the dissenting voices from these orthodox, closed communities. For attaining their faith, (confidence), she has to go for a makeover and she succeeds in identifying herself with the tribal outlook. She becomes a trusted member of these forest dwellers and with their ardent support, leads the whole community in fighting out injustice to the poor. Dayabai becomes a symbol of hope for many who are yet to enjoy the fruits of modernity. The tribal people learn to cope up with the changing world and thus she becomes a beacon of light for many.

The life of Bama is set apart for the service of the Dalits who are yet to claim equality with the upper castes. Being born into a Paraya Christian background, she had always firsthand experience of discrimination based on Untouchability right from the times she was a child. Even at the time of death they had to face --- on account of their 'low birth'. Bama says: "The cemetery where the Christians buried their dead was just next to the Chaliyar community school. Only we Dalits buried our dead there, though"(Karukku,25)She had aversion for the discriminatory practices that existed even within the church. For her Jesus was a presence she could identify with the lives of the poor. She says:

"With such an ecstasy of devotion, they claim in church that God was born into a poor family, lived among the poor, and died poor. But if by accident a lowly and poor person appears within the precincts of the convent or the school, they will fall upon those persons like rabid dogs"(Karukku, 92).

This disparity between words and deeds remained unbridged and it remained beyond the reach of a Dalit Christian nun's comprehension. She was one who had acquainted herself with the strict observance of the religious codes. She had internalised the picture of Jesus as one among the poor and destitute. The church celebrated a different version of Christ who had little to do with the image she held in her mind. Nearly all of the Biblical citations held up by Christian communists to support the idea that Jesus instituted a form of communism during His mortal ministry are based on the idea that Christians are instructed to provide for the sick and the destitute. The hypocrisy of the church authorities infuriates her and she remarked thus:

"Either they should come out with it and say that ours is a God, who serves the rich; we follow him and worship him alone. Otherwise they must say ours is a God of the poor, who chose to be born in a cattle-shed, we too are like him"(Karukku, 93)

She has the power to proclaim that she has set out to redeem the Redeemer who is now pleading mercy at the doors of the monasteries? Dayabai says:

"There is the spreading of a culture that expels the poor and the lowly. In other words this is a different form of police excesses. Following this trend even the Christian church expels these from their institutions. Malayali, adivasi and the underprivileged are kept in abeyance as outcastes? (Pachaviral,68)

The lives of two women have left an imprint as a corrective force within the Christian domain. It teaches how to be best guided by the gospel in times when there are greater chances for deviation. The two accounts are autobiographies that add to the veracity of

narration. As Limbale observes, "Not only has there been a preponderance of Dalit autobiographies, fictional narratives too has used the biographical or autobiographical forms to narrate the Dalit experience."(*Towards an Aesthetic of Dalit Literature* ,12) They exhibit enormous amount of courage to be the follower of Jesus Christ.

As members of the weaker sex they have to fight out the encroachments on their body too. It is with such an account that Dayabai opens her narration. Similar story is shared by Bama when she comes back into her community to fight for herself and her dalit brethren. Several times they face challenges from the authorities. Dayabai had to combat the rumours about her being a missionary involved in conversion of the tribals. When they got no proof to validate their claim, they started accusing her of being a naxalite. Still she had the confidence of the tribals that helped her to come out of these accusations. They are attacked thus because they seek a way out from the institutions of patriarchy. If one finds an element of protest emanating from the soul of a woman, it is subdued with all powerful force. Hence these two authors had a tough time fighting with the perpetrators of the rule of the father to establish the rule of the poor and lowly as per the dictates of their Overlord.

Hence it can be viewed that the Christian church over the period of time has deviated from the path of their Leader and are mostly found in circles that protect the interests of the upper class and the dominant groups. It is an aberration made norm by customs and practices. However the notion of a classless society of believers, equal in the eyes of God and the members of that community, is widespread across most forms of Christianity, at least as an aspiration.

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BREAKING BARRIERS: CHANGING TRENDS OF COMIC GENRE IN HINDI CINEMA

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Abstract: The comic genres in Hindi Cinema dates back to some of the earliest actors who have proved their excellence by making the spectators roll in laughter. Actors who have done justice to their roles as comedians have also done justice to their acting skills as it is difficult to make people laugh. But over the years the comic genres in Hindi cinema have changed from its role of serving as comic relief and being part of other genres to gaining its own position as a separate category. Humor has always been welcomed by the Indian audience but for the dark humor in movies like *Being Cyrus* which was not accepted until recently by the Indian audience. However, in the recent years the cinema goers have grown to accept dark comedy in movies like *Dev.D* and *Delhi Belly* where the sordid humor brought out in the film has been much acclaimed by the new generation as their pulse and have started accepting the explicit language made popular through such movies. The comic genre of Hindi cinema has undergone considerable change since the time of its inception and is still in a state of flux. This paper attempts to look into the change that has come about in the comic genre and acceptance of dark humor depicted in the select Hindi movies in the last ten years.

Key words: Comedy Genre, Hindi cinema, Bollywood Comedy Cinema, Dark Humor, audience reception.

Introduction

The Comedy genre is probably the oldest genre in Hindi cinema which dates back to its inception as early as the 1950s with actors like Johny Walker , Bhagwan Dada, Gope and Mehmood Ali, to name a few. Comedy has continued to keep the audience entertained and glued to their seats making them roll in laughter at the gimmicks of the skilled actors who have proved their mettle. However, the comic genre in Hindi cinema seems to have been limited to slapstick comedy where laughter is invoked through practical comedy brought out in the situation and actions of the actors. Movies which came up with a difference in this genre were rejected outright by the audience labeling it uninteresting and bland. It needs to be mentioned that recently with movies like *Delhi Belly* a new trend has been set in Hindi Cinema giving emphasis on grotesque and dark humor. This paper essays to analyze the shift that has taken place in the comic genre from slapstick comedy to black comedy and acceptance of dark humor depicted in the select Hindi movies in the last ten years.

Comedy has become an inevitable part of Bollywood cinema. No Bollywood movie is complete without a comedian interrupting the narrative with his presence thereby taking the audience away from the situation presented on screen and injecting laughter in an attempt to make the scene light. Earlier movies incorporated comic scene in movies as comic relief giving the audience a light hearted scene when the narrative became serious. However this trend seems to have slowly changed giving way for movies that aim at amusing the viewer from the beginning till the end. Slapstick comedy is a sub-genre of film that incorporates physical comedy into the story and uses visual action in the form of harmless violence and horseplay in depicting humour on screen. Films falling into this category often rely on comedic timing and controlled psychical performance of a single actor or actress. Most Hindi films have incorporated this sub genre in it.

Albela (1951) is considered as the first Comic movie in Hindi in which the actor cum director of the movie, Bhagwan Dada has entertained many a viewers with his scintillating acting skills. Nevertheless, it can be seen that comedy brought out through the movie does not in any way affect the narrative of the story. It is well blended into the story line such that the laughter is quite naturally invoked. In the scene where he enters his office asking a fellow staff for his manager in a head strong way while the manager was away, his rushing to the manager's room and hitting against the door makes us laugh aloud effortlessly. No viewer can ever forget the scene where he is fired from his job. Although the scene is full of pathos it is humorously enacted out by Bhagwan Dada projecting his passion for the acting career. Though the movie has in store for the audience more than one heart whelming scene where we would otherwise break into tears, the actor has brilliantly with his acting skills made us laugh at it. Comedy in Hindi cinema has enthralled the audience down the years with eminent actors like Mehboob, Johnny Walker, Johnny Lever, Kader Khan, Shakthi Kapoor, Anupam Kher, Govinda and superstars like Amitabh Bachan with their gimmicks and superb acting skills. However, it would be improper to not have mentioned a few movies that have changed the trend of comic genre in Hindi cinema which are *Munna Bhai M.B.B.S.*, *Lage Raho Munna Bhai*, *Golmaal*, *Hera Pheri*, *Phir Hera Pheri*, *Golmaal Returns*, *Bheja Fry*, *Bheja Fry 2*, *Adhiti Thum Kab Jaaoge*, *Saath Khoon Maafand Delhi Belly*, from the past ten years.

If you closely analyze the movies from 2003-2013 it would definitely strike a note that most of these movies have been a remake of a movie made elsewhere. Some of which are:

Sl. No.	Hindi Cinema	Year	Remake / has similarities with the movie
1	Hungama	2003	Telugu film <i>Gopala Rao Gar iAmmayi</i> and Malayalam film <i>Poochakkoru Mookkuthi</i> .
2	Hulchul	2004	God Father
3	Paisa Vasool	2004	High Heels and Low Lifes
4	Garam Masala	2005	Boeing Boeing
5	Phir Hera Pheri	2006	Guy Ritchie's Lock Stock and Two Smoking Barrels and Charlie Chaplin's Circus
6	BhagamBhag	2006	Sub plots from MaanarMathai Speaking-Malayalam film and Vertigo- English Film
7	ChupChupKe	2006	Punjabi House- Malayalam cinema
8	Golmaal	2006	Kakkakuyil-Malayalam cinema
9	Pyaare Mohan	2006	Aandipatti Arasampatti-Tamil cinema and See No Evil Hear No Evil- English Movie
10	Malamaal Weekly	2006	Waking Ned Divine- English movie
11	Dhol	2007	In Harihar Nagar-Malayalam movie
12	Partner	2007	Hitch-English movie
13	Victoria No.203:Daimonds Are Forever	2007	Victoria No. 203- 1972 hit Hindi movie
14	Bombay To Goa	2007	Bombay To Goa-1972 Hindi cinema
15	Bheja Fry	2007	Le Diner de Cons-French Film
16	Good Boy, Bad Boy	2007	Class Act- 1992 English Movie
17	One Two Three	2008	Blame It On The Bellboy- English Movie
18	Krazzy 4	2008	MookillaRajyathu- unacknowledged adaptation of Malayalam Cinema
19	Mere BaapPehleAap	2008	Ishtam-Malayalam Movie
20	Ugly AurPagli	2008	My Sassy Girl-Korean Cinema

21	Maan Gaye Mughal-e-Azam	2008	To be or Not to be- English Movie
22	Welcome to Sajjanpur	2008	Phalkon Ki Chaon Mein- 1977 Hindi Movie
23	HariPuttar: A comedy of Terrors	2008	Home Alone-English movie
24	ChalChalaaChal	2009	Varavelpu- 1989 ,Malayalam movie
25	DoontheRehJaaoge	2009	The Producers- English Movie
26	Jai Veeru	2009	Bullet Proof- 1996,American action comedy
27	Paying Guests	2009	Ashi Hi BanwaBanwi – Marathi Movie
28	Shortcut	2009	UdayananuThaaram- Malayalam Movie
29	Daddy Cool	2009	Death At A Funeral- British comedy
30	Do Knot Disturb	2009	The Valet- French Film
31	Dedanaa Dan	2009	Vettam –Malayalam Movie
32	Hum Tum Aur Ghost	2010	Ghost Town- English movie
33	KhattaMeetta	2010	Vellanakaludenadu- 1988,Malayalam Movie
34	Hello darling	2010	MagalirMattum-Tamil Movie
35	Khusti	2010	Mutharamkunnu- Malayalam Movie
36	Action Replayy	2010	Back To The Future- English Movie
37	Tees Maar Khan	2010	After The Fox- Italian Movie
38	UttPatang	2011	A Stranger of Mine- Japanese Film
39	Naughty @40	2011	The 40 year old Virgin- English movie
40	Luv Ka The End	2011	Must Die-English movie
41	Ready	2011	Ready-Telugu film
42	Loot	2011	Crime Spree- English movie
43	Housefull 2	2012	Mattupettimachan- Malayalam Movie
44	Vicky Donor	2012	Starbuck- English Movie
45	KamaalDhamaalMalamaal	2012	MarykunderuKunjaad- Malayalam Movie
46	JabbGazab Love	2012	SeemaTapakai- Telugu movie
47	Son of Sardar	2012	MaryadaRamanna-Tamil Film
48	Mere Dad Ki Maruthi	2012	Dude Where's my car?- English Movie
49	Himmatwala	2012	Himmatwala- Hindi Film
50	ChashmeBaddoor	2012	ChashmeBaddoor- Hindi Film
51	NautangiSaala	2012	ApresVous- French Film

Sadly enough some of the Hindi movies that are categorized under the comic genre have received negative reviews and have not made it at the Box office. A movie is considered successful if it has made a good collection at the Box office. However, much to our surprise we realize that movies are but rated as good and bad or enjoyable and unenjoyable based on the actor who is starring in the movie. Movies like *Xcuse me* (2003), *KisKis Ki Kismat* (2004), *Bach KeRehna Re Baba* (2005), *KyaKoolHai Hum* (2005), *Home Delivery...ApkoGharThak* (2005), *Bhola in Bollywood* (2005), *MrYa Miss* (2005), *PadmashreeLaloo Prasad Yadav* (2005), *Rahul's Arranged Marriage* (2005), *Little Zizou* (2009), *Lottery* (2009), *Ek Se Bure Do* (2009), *MeriPadosan* (2009), *Love Kichdi* (2009), *Aagey Se Right* (2009), *Fruit And Nut* (2009), *Tere Bin Laden* (2010), are some movie s that never got noticed although these movies had featured some good comedy.

Movies like *Masti* (2004), *No Entry* (2005) , *Garam Masala* (2005), *Bunty Aur Bubly* (2005), *Maine Pyaar Kyon Kiya?* (2005), *Lage Raho Maunna Bhai* (2006), *Phir Hera Pheri* (2006), *Welcome* (2007) *Partner* (2007), *Golmaal Returns* (2008), *Dostana* (2008), *Chandni Chowk To China* (2009), *3Idiots* (2009), *Wake Up Sid* (2009), *AjabPrem Ki Ghazab Kahani* (2009), *De Danaa Dan* (2009),

Housefull (2010), *Golmaal 3 (2010)*, *Tees Maar Khan (2010)*, are some movies that have made it at the Boxoffice not merely for the comedy inherent in these films but also for the mainstream actors who have done justice to their comic roles. Bollywood, known for its romantic movies has always featured good comedy with actors like Khader Khan, Shakthi Kapoor and Om Puri in comic roles who had earlier appeared on the silver screen in villainous roles. These actors were the trend setters whose shifts from the villain roles to comic ones have later attracted many other actors into donning the comedian's role in mainstream Hindi cinema.

With a director like Priyadarshan who has remade more than one Malayalam cinema into Hindi, majority of which falls into the comic genre, the audience has been exposed to more comic flicks in the recent past. Not that there were no comic flicks in the Hindi cinema but because he has made use of the mainstream actors in his movies whom the audience has seen in more "serious roles" on screen. In movies like *Hera Pheri* and *Phir Hera Pheri*, Priyadarshan has made us burst out in laughter at the slapstick comedy enacted out by actors like Akshay Kumar whom we have otherwise seen doing only serious action or romance. However it needs to be mentioned that in 2010 there has been a serious change in the number of comic movies remade into Hindi and in 2011 two movies were released in the dark humour category, thereby making the change evident. 2010 can be considered as a period in which we can note a notable change coming up in the comic genre of Hindi cinema with more movies being released in the following sub-genres like spoof, comic satire, dark humour and political satire which is indicative of Hindi comic genre accommodating a change in it.

The fact that the dark humour movies namely *Delhi Belly* and *Saath Khoon Maaf* were successful at the box-office reinstates the idea to some extent that the Indian cinema goers have started accepting black comedy. Comic genre in Hindi cinema had focused on slapstick comedy until recently when movies like *Peepli Live* (Satirical Comedy), *DevD* (Parody) and *Quick Gun Murugan* (Spoof cinema) were not very well appreciated by the public. However, each of these movies falls into different sub genres of comedy, in which movies were not previously seen to have been made. A major portion of our cinema has concentrated its comic flick to generate humour from the situation and the action of the actors rather than focusing on the plot. Never the less, these movies have made their mark by the effort and skill of the actors who have done justice to their roles. Black Comedy is a sub-genre of both Comedy and Satire that has very recently made its presence vivid in the industry. These films often explore concepts and topics that are considered taboo. Black Comedy takes topics and situations that are commonly held as serious and explores them in a comical way. Because of this approach, Black Comedies often cause the audience to laugh and feel uncomfortable simultaneously. Here I have tried to read into two movies that can be called dark comedies namely *Delhi Belly* and *Saath Khoon Maaf* which were much acclaimed and appreciated worldwide for reproducing the sordid humour in a comical manner and thereby amusing the audience.

In *Delhi Belly* we get to see how three young men, who have been struggling in their lives, ending up inviting more trouble and havoc by being associated with a gangster Somayajulu as he is called in the movie. The three men, Tashi (Imran Khan) a journalist, Nitin Berry (Kunaal Roy Kapur), a photographer and Arup (Vir Das), a cartoonist lead an unkempt and debt-ridden life in a shoddy apartment. Sonia, Tashi's girl friend who is an airhostess is asked to deliver a package to Somayajulu by Vladimir Dragunsky. Sonia takes it light and entrusts this duty to Tashi totally oblivious of the contents of the package. Tashi deposes Nitin for the task, who fails to fulfill it as he is suffering from 'Delhi Belly' (loose motion). Tashi who gets into a brawl with his colleague, Menaka's ex husband gets a black eye which makes us giggle but with a frown. Strangely enough they walk into more trouble when they realize that more chaos is in store for them at the hands of the gangster Somayajulu who waits in his apartment keeping one of his roommates to stand on a stool with a noose around his neck. Even though this scene evokes laughter it does make the spectator uncomfortable because the spectator does not know if he is going to be hanged the very next second. A similar scene which is amusing yet gross, where the spectator

would sit with eyes closed, is when Tashi fixes dynamite into one of the gangster's bottom. In his attempt to get the right information from the gangster he lights it. This scene not only increases the heartbeat of the spectator but also makes one laugh at the thought that it could possibly work. The mix up with the packet of diamonds and the packet for Nitin's doctor is cleared and they manage to escape from Somayajulu and gang when the ceiling gives away.

The events actually make the spectators roll in laughter and scowl at the screen at the same time, especially when Somayajulu spills the contents of the packet meant for Nitin's doctor on the table in his attempt to confirm if it had diamonds. All these events take a big turn when they realize that Sonia has been kidnapped by Somayajulu who assures to release Sonia when Tashi and his friends return the diamonds. At this point the three decide to disguise themselves in Burqa and loot the jeweler to whom they had sold the diamonds. The jeweler's refusal to return the diamonds for the same amount forces them to rob the jeweler and run with the police chasing them into the hotel where Sonia was held. The movie ends with everything falling back in place and Tashi breaking his engagement with Sonia at the realization that he did not love her but his colleague Menaka who was with him through thick and thin. The obscene language has earned the movie an 'A' rating by the censor board. We can't but agree to the fact that Hindi cinema has not seen another movie of this sort at any time in the past and Bollywood has of course given this movie a happy ending in spite of being a black comedy probably to assuage the effect of the dark humour portrayed in the movie. Although one would find it difficult to accept a movie of this kind being accepted by the general public, it comes as a surprise that the movie was one of the top movies in the list of blockbusters. Sigmund Freud, the father of psychoanalysis who put forth the theory of gallows humour argued in his essay 'Der Humour' (1927) that sick jokes were the mechanism by which the ego "insists that it cannot be affected by the traumas of the external world".

The movie *SaathKhoonMaaf*, released in the same year as *Delhi Belly* tells the story of an Anglo-Indian lady whose husbands die under strange circumstances. The movie has beautifully and subtly brought out the life of Susanna who finds it difficult to adjust with the men she got married to. Each one had a flaw that she could get rid off only by killing them. This movie is a classic black comedy where one cannot find traces of the typical Bollywood movie which ends on a happy note. It is interesting to see the dark humour depicted in this movie in the form of flawed husbands of Susanna. Nevertheless, her efforts to live a 'perfect life' with the 'perfect man' goes haywire when every man she tries to live with makes her life difficult with his one 'quality' that she cannot tolerate. From her first husband, Edwin Rodrigues ; an army major who is overbearing, jealous and possessive; she has to suffer mental torture as he is disabled, he cannot believe that a beautiful woman like Susanna would be faithful to him. However, her troubles does not seem to end here, from her second husband, Jamshed Singh Rathod, who renames himself as Jimmy Stetson after their marriage, a singer whose flaw is pride is found to misuse his new-found fame. He steals songs, dallies with other women and becomes dependent on drugs. It is indeed funny to note that she finds solace by disposing him which is not quite likely to happen in real life. The ease and effortlessness with which Susanna disposes her husband makes the spectator smile at the practical joke made out of life. She disposes him with an overdose of heroin. Wasiullah Khan who is also known as Musafir, is her third husband. He is a soft-spoken, thoughtful poet by day and a sadistic masochist by night. Susanna tries to cover her bruises with makeup but her servants cannot bear to see her mistreated, and advise her to get rid of him. Khan is ultimately forgotten in a snowy grave in Kashmir. Killing is portrayed as a very simple and light task in the movie that one would find it easy to get rid of people and move on with life. Her fourth husband, Nicolai Vronsky (Aleksandr Dyachenko), is a Russian spy who is leading a double life. When Susanna discovers he has another wife and family she easily takes her anger out with the help of her pet snakes. After Vronsky's death, Susanna soon realizes that she could easily dispose the person she disapproves without any guilt or prick of conscience. It is pretty interesting to note that killing is made more comfortable and easy for Susanna by her fifth husband Keemat Lal who is a police inspector who has shielded his "Madame" from prosecution for two murders in exchange for marriage. With a voracious appetite for sex, his dependence on Viagra gets him a good

ending one night with an overdose prepared by Susanna. As a last refuge when she decides to take her life, instead of being a blessing, her doctor Modhusudhon Tarafdar proposes to marry her making her the sole heir of his property. Actually bankrupt, he tries to poison Susanna with mushroom soup several years later for her inheritance. Although we find her alive towards the end of the movie with her perfect husband Jesus the movie makes you titter at the thought that she managed to do so much in one life. More than laughter it is the sarcasm brought out through the life Susanna with her seven husbands that catches the attention of the spectators. The difficult times endured by her while handling them at various stages of her life seems to have been well appreciated by the Indian cinema goer, which was not quite likely to happen in the yester years.

Humour is often used as a defense mechanism in the black comedies. According to George Eman Vaillant's (1977) categorization, humor is level IV mature defense mechanism: overt expression of ideas and feelings (especially those that are unpleasant to focus on or too terrible to talk about) that gives pleasure to others. Humour, which explores the absurdity inherent, in any event, enables someone to "call a spade a spade", while "wit" is a form of displacement (level III neurotic defense mechanism). Wit refers to the serious or distressing in a humorous way, rather than disarming it; the thoughts remain distressing, but they are "skirted round" by witticism. The self deprecatory humour hinting at the triviality of relationships and the treatment of life before pleasure and wealth is beautifully depicted through these Bollywood movies.

The success of black comedy is a way of stating the idea that people have changed their perception of tragedy and the way they cope with it. The new generation movies have not only moulded the public's perception of tragedy but have taught them to laugh at it. Comedy flicks were depicted earlier with the intention of serving as a comic relief to help the spectator forget his worries and laugh out loud in the cinema hall but it has changed. Today, spectators go to the cinema hall not to forget their worries but to understand them and to learn to laugh at it. Black humour was unfamiliar to the world until the early half of twentieth century. Though in 1940, the French Surrealist, André Breton published *Anthologie de l'humour noir* ("Anthology of Black Humour," frequently enlarged and reprinted), the term did not come into common use until the 1960s. Today, however, the term is the most familiar one especially among the Indian spectators and the term has been widely accepted through the visual media that communicates to large audience-cinema. Indian cinema had about it an invisible barrier that restricted the genre of comedy from going beyond the slapstick style. Nevertheless today, with the changing taste of the Indian cinema goer and his experience with new tastes of the comic introduced to him by few innovative directors, Indian cinema has gone beyond the barrier successfully breaking it and incorporating the sub genres of comedy which was once left unexplored. Horace Walpole has rightly said that imagination was given to man to compensate for what he isn't. A sense of humor was provided to console him for what he is.

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START, ACTION, ON RECORD: WOMEN AND MEDIA, THE INFALLIBLE BOND TO EMPOWERMENT

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Gender inequality is a fact of 'real' life, as much as it prevails in 'reel' life. Women representations in the reel world as the weaker sex have only strengthened this stereotype which has been assimilated into the Indian psyche over the years. The representation of resilience in women is a rare scene on the silver screen. However, this recurring impression has not only influenced the role of women in the society but has weakened their morale and confidence. Restricted in the cultural code that dictates what to do and what not to do, women fail to communicate themselves. The structuring of our culture and the behavioural pattern of its people is greatly influenced by the characters and their lives depicted on the silver screen. Women are assigned their roles in society which are constructed in accordance with the dominant culture. Over the years there have been several attempts to break away from the shackles of patriarchy.

Going a step ahead to have a quick glimpse of the real world scenario of women and their empowerment it needs to be mentioned that there has been a considerable change. Through education and awareness women have made their contributions to the media world which has been crucial in empowering women. Although the TV channels celebrate the atrocities faced by women it needs to be asserted that these channels have also contributed in bringing them to the fore from the confines of their kitchen.

This paper attempts to look at the select few reel life women who have been portrayed as non-resilient and the real life women who have lived through atrocious situations and have proved their resilience in life. It also looks at the current situation taking into consideration the various atrocities against women that have multiplied in the recent past, contributing negatively to women empowerment and its impact on the women community.

Women empowerment has been an issue of concern for a considerable period of time now. The primary goal of empowerment is to improve the condition of women in society and media has contributed to this by focussing on the marginalization and disregard of the women's lot and problems faced by them. Resilience can be ensured and enhanced to a great extent by empowering them economically. Gender equality is necessary for women to realize themselves through which they develop self esteem and enhance the ability to assert themselves. Women more often than not are unacknowledged and unheard in a patriarchal society where the importance is always for men. It needs to be mentioned that media has a decisive role in constructing roles for women and men in society. Media representation of women is in a way indoctrinating the roles into our psyche which has a great influence on our conscience.

Significantly enough women looking for safety at the hands of a rescuer are very common sights to any Indian cinema goer. Over the years our cinemas have celebrated this and continue to do so. If it was being rescued from a villain in the 90s, it changed to seeking refuge in his heart in the 20th century and has slowly gone a little farther as to having multiple affairs but finally searching for an identity in a man's world as has been the doctrines dictated to the women folk through our cinema. Media plays a major role in distorting reality with the representation of women. Women represented as subservient and timid on the look out for help from a strong man who is independent is a common sight celebrated on our silver screen. Women appear only in supportive roles in films and when the movie revolves around the female character then she is depicted as catering to the needs of the male spectator where her body is objectified. As opined by Laura Mulvey, the feminist film theorist in her

ground breaking article 'Visual Pleasure and Narrative Cinema' man controls the film phantasy and also emerges as the representative of power (Mulvey, 838), which is made possible through the processes set in motion in the movie where the film is structured around a main controlling figure with whom the spectator can identify. And as this happens the spectator tends to identify with the male protagonist's gaze which is male. Movies are structured from the perspective of this controlling gaze which the feminist film theorists conceive as the 'male gaze'. The female characters, constructed from the perspective of patriarchy are incomplete, false and misogynistic. Feminist film critics are of the opinion that women are depicted according to the societal definitions which are articulated through the ideological practice called movie. Laura Mulvey, in her article 'Visual Pleasure and Narrative Cinema' explores the fascination of film with the help of psychoanalysis. According to her the individual spectator and the social constructs that have moulded him/her already plays a crucial role in positioning the spectator's controlling gaze as male. In a world ordered by sexual imbalance the pleasure in looking has been split between active/male and passive/female. The relationship between the spectator and the screen is determined by two different ways of looking. The first being active *scopophilia where the person looked at is eroticized, distancing the spectator from the object onscreen and the second is scopophilia in the narcissist aspect where the spectator identifies with the object onscreen. This relationship tends to objectify every female character appearing on the big screen and diminishes her character no matter how strongly she has been portrayed. Thus it needs to be emphasized that cinema is that media where reality is constructed from the perspective of the dominant culture.

Through Cinema, a different kind of media as it may be called; there has been an attempt to idealize women as goddesses, caretakers and emotionally weak persons capable of nothing but worrying and confining them within the boundaries of femininity, which according to Simon de Beauvoir is acquired through social conditioning. According to Simon 'one is not born, but rather becomes, a woman'. Cinema has lately started to become a part of the Indian culture, which mirrors the state of women in the 'Indian homes'. More than three quarter of the country depends on the visual media which projects women as house wives ready to sacrifice their career life and dissolve their identity to protect families from falling apart. The practice of representing woman content with the life gifted to her by man, the happy house wife image is a misconception compelled through cinema especially in the Indian context. This practice distances the reel life image from the image seen in real life. Women are consistently associated with stereotypical situations and characters, a way of linking the idea (i.e. woman) to the image, constructed by patriarchy that helps the spectators of both genders to easily identify her on screen. The fixed and recurrent images of women are objectionable distortions which will have a negative impact on the female spectator and hence calls for a change.

Borrowing Roland Barthes' ides of 'myth', Claire Johnston has investigated on the myth of 'Woman' in `*classical cinema. According to her the sign 'woman' can be analyzed as a structure, a code or convention. It represents the ideological meaning that 'woman' has for men. In relation to herself she means no-thing (Claire, 25): women are negatively represented as 'not-man'. The 'woman-as woman' is absent from the text of the film (Claire, 26). Here cinema has to be understood as reflecting reality which is constructing a particular ideological view of reality. Having concealed the ideological construction, classical cinema is never seen to have exposed its means of production. Hence, classical film narrative can present the constructed images of 'woman' as natural, realistic and attractive.

Here I have drawn upon select few female characters which are celebrated as brave and resilient characters reigning in the history of the Malayalam Film Industry who when closely analysed prove to have been constructed from the perspective of patriarchy.

The first of them, a very interesting character that stands up alone to face life with her kids is that of Shyamala in Chinthavishthayaya Shyamala. Although portrayed as bold she is painted from the perspective of a male artist. The stereotypical house wife who tolerates all the tantrums of her husband is brought out brilliantly in this movie. Her husband Vijayan, whose is a graduate in

Economics is an idealist who tries to mint money through the theories he learned. However, his many failed attempts and the numerous bills that are due make him leave his family and go on pilgrimage to the different temples in the country. At this crucial stage where he walks out of the family leaving his wife, Shyamala and children behind she decides to face life alone. However, in the end we find her falling back on her husband who returns after his so-called journey in search of truth to fill his slot kept vacant by a dedicated wife. One of the most memorable roles donned by Manju Warriar during her career in the Film Industry was that in Kanmadam as Bhanu. We get to see her facing the tumultuous situations in life and handling them carefully, looking forward at life with hope. Although we may mistake her to be strong in more than one scene we can catch her confessing her weaknesses to a stranger who she believes has come to relieve her from the string of troubles. The image of a rescuer is again a constantly repeated image seen in our cinemas.

A movie that caught much attention recently is 22Female Kottayam where the character Tessa takes revenge for being cheated and raped more than once by her boyfriend's boss. However, when this picture was released the movie was subjected to severe criticism as a woman fighting for her rights have always been misinterpreted as having a loose morale. Here too criticisms were showered questioning Tessa's decision to shift to Cyril's flat as an attempt from her end to invite danger. However what intrigues the viewers is the justification that any women may be subjected to rape in a similar situation and it is justified. The contribution made by Cinema to the society in structuring the codes is poignant and calls for a change when compared to the real life heroines who have withstood the atrocities and come a long way in life.

Women were silent about the molest attempts they came across be it at home or out side considering it as a taboo to voice it out loud but now with the help of media, the new channels and live telecasts they have started to call out to their fellow women folk and is no longer seen as a shame. The string of rape news reported recently where women have come forward and raised their voice against men, some of whom have got away with it, reflect the slight change that has taken place. These news reported and telecast have become an eye opener for those women who have taken lessons only from movies they have been exposed to- a different media that can be manipulated at the hands of the dominant culture. However, the courage shown by them in facing the consequences is definitely a positive change in the history of women empowerment.

Women are slowly moving towards an era where they will slowly be liberated but for cultural constraint that force the news agencies to hold back the names of the rape victims who will not be accepted with their identities revealed as was the case of Jyothi, a 23 year old rape victim who was brutally raped by seven in a moving bus.

Women who have protested have had to undergo much resistance in a patriarchal society like ours but unlike the reel life heroines the real life heroines have come out successful without relying on another male. Living with the torture for the sake of the family is considered as the responsibility and duty of women alone. However there are a few women who unlike our popular cinema have walked out of torture and have proved themselves to be resilient. Such is the story of Snehalata who has walked out of her wedlock after years of suffering and does not regret having done so. Shanno who was beaten black and blue by her husband because she took two minutes to open the door recently opened her heart before the viewers on a famous TV programme Staymeva Jayate which was hosted by the Bollywood Super Star Aamir Khan. She retaliated to her husbands thrashings and walked out of the relationship. She now works as a driver and gives the credit to her daughter who worked in order to provide for the family and for her mother's driving lessons. The story of Bilkis Banu who survived the 2002 communal carnage in Gujarat is another heroine of the real world. She was raped by the fellow villagers and her family members were killed before her. Here too as in many of the reel life stories Bilkis was coerced into withdrawing her statement against the accused villagers. However unlike our movies the timely intervention by some social activists led to a CBI probe which brought out a verdict in favour of Bilkis. This is another instance where the real life stories of the brave hearts will help in stirring awareness among women folk as to how and what role media plays in advocating the importance and need for women to react to atrocious situations and emerge from the chrysalis of

cultural taboo in which they had been hitherto confined. Today these women are living independently and with courage that is ever radiating through their lives.

However it needs to be asserted that there definitely exists an infallible bond between media and women empowerment that is constantly strengthened with the experiences of resilient women, whose voices have reverberated across the ages and continues to do so.

END NOTES

*Scopophilia: Freud associated scopophilia with taking other people as objects, subjecting them to a controlling and curious gaze.

*Classical Cinema: are terms used in film history which designate both a visual and sound style for making motion pictures and a mode of production used in the American Film Industry between 1927 and 1960. This period is often referred to as the "Golden Age of Hollywood." An identifiable cinematic form emerged during this period called classical Hollywood style.

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POLITICS OF REPRESENTATION: CHALLENGING THE STEREOTYPICAL PORTRAYAL OF RAPE VICTIMS IN CINEMA

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Gender roles are predetermined and the woman is trained to fit into those roles. The construction of femininity is controlled by patriarchy- by men who impose a code marked by chastity, submission and asceticism. She is always treated as a sex-object or a procreating device. The mystification and stereotyping of women is instrumental in creating patriarchy, where she is treated as an 'inferior Other'. No wonder patriarchy justifies polygamy as part of 'manliness'.

Society attributes particular values to the woman's body, and the woman assimilates these values. Her sexuality, desires or identity is determined by the social norms that have themselves been produced by men. Just as motherhood is projected as the climactic moment of the woman's life, those who are not virgin are represented as lacking something. She is always, therefore, anxious about her lack. She becomes the other with a lack. Female morality is a significant element in the ideology of patriarchy which seeks to construct a society accordingly. The projection of 'virgin' is only one dimension of it. When the laws of female morality are laid down, the hypocrisy of the male attitude is exposed. Body remains central to the self. Marriage, love, rape all work on it.

The woman has been socialised and trained to believe that these are what truly makes her feminine. That is, the characteristics one associates with the feminine in women are socially given values, and the woman assimilates these values so that she fits into the category of the feminine. (Nayar 85)

Cultural texts naturalize the oppression of women through their stereotypical representation of women as a sexual object. Cultural structures are ideological as it provides a system of belief that seek and attain the woman's consent to be subordinated. Cultural practices and structures, like film and literature reflect the material conditions in the society. Consequently the unequal power relations between men and women find expression in such literary texts. There is, then, a chance for the strategic projection of stereotypes. Cinema, being one among the most powerful media, plays an important role in social brainwashing and mind mapping. The binary opposition inherent in the process of categorising female identity as 'virgin' or 'whore' emphasises the indispensable reliance on defining female identity in terms of chastity.

In cinema rarely an attempt is made to pair a male protagonist with a female who is not a virgin. Virginitly has thus become an unwritten, but a defining element for a female. For instance, in the movie *Megham* the protagonist (starring Mammuty) is paired with a widow (Tessa). But her life is penned in such a way that her husband is forced to leave her as a virgin. So the patriarchal repressive principle of 'purity' is asserted again in the process of offering a virgin to the male protagonist. We can hardly find a Malayalam movie in which a male ('virgin' or not) is paired with a female (who is not a virgin). *Azhakiya Ravanan* is definitely an exception.

Consequently, the stereotypical portrayal of rape victims in cinema results in creating problematic images of female identity in the subconscious realm. Rape victims having lost their defining element are stereotyped as 'fallen woman'. The other end of woman as the object of male gaze and as the desired possession is rape. Rape is the only crime where the victim is perceived as guilty. She is never treated as a normal human being.

Rape is a social as well as a personal crime wherein the female body becomes the site of contestation between power and powerlessness, between imposition and freedom, between the system and the individual. The moment there is a protest, all social institutions- marriage, family, law - all ideas of respectability and loyalty conspire to silence the female voice. It is common knowledge that rape is one of the least reported events due to a variety of reasons. One of them is that it results in a long drawn legal battle, humiliation and public exposure. And inevitably it also results in character assassination, attacking the moral behaviour of the victim. (Jain and Rai 236-237)

22 Female Kottayam is one among the contemporary films which bravely offers a new life to the protagonist who is a rape victim. *22 FK* is a 2012 Malayalam language 'Indian rape and revenge film' directed by Aashiq Abu. The film deals with the travails of a nurse who was victimised for no fault of hers and who takes revenge on her tormentors in a rather unusual manner. Aashiq Abu has become one of the most promising young directors of Malayalam film industry. His debut *Salt and Pepper* was well received by the ordinary people and the critics alike. *22 Female Kottayam* is his next flick. The movie is really innovative. The script of the movie was penned by new comers such as Abhilash Kumar and Shyam Pushkaran. It has enough stuff to evoke the sense of the viewer. It deals with the story of a young nurse called Tessa K. Abraham. The story of the movie is set on the background of Bangalore, one of the cosmopolitan cities in India. Tessa is working as nurse in a hospital at Bangalore. She dreams a great career by flying abroad especially in Canada. And for the same reason she meets with Cyril (Fahad fazil) a handsome and smart guy. Cyril helps to solve certain issues related to her certificates. Meanwhile both Tessa and Cyril fall in love. They drink together as well as share bed together. They used to wander over at night. One day Cyril asks Tessa to stay with him at his apartment. They began to live together. Suddenly certain unfortunate things happen. Tessa is brutally raped by Cyril's Boss Hegde. The rest of the movie deals with the further changes in the life of Tessa.

The movie shows exploitations and other abuses against nurses. It also provides a post modern perspective to love, sex and man-women relationship, virginity etc. The film is extremely unconventional. The female lead character is not at all conscious about virginity. She had lost virginity during her adolescence period itself and never expresses a sense of regret in that. She never hesitates to drink with his lover. She is used to wander with him at night. Tessa is not a typical heroine. She is extremely unconventional, even brutal rape can't disturb her much. She is a representative of post modern bold girls. The movie also breaks all the morality codes. It brings out certain innovative thoughts in man-women relationship as well as sex. Liberation of body is the main theme of the movie. The movie doesn't oppose the role of physical relation in love. It deconstructs Victorian morality and shows a new path to Malayalam film industry.

Tessa is definitely not the first powerful female protagonist in the Malayalam film industry. Several attempts have been made before to portray influential female characters like Padmarajan's Clara. In *Thoovaanathumpikal*, Clara does not appear throughout the movie but it is she who drives the whole story. Padmarajan's Clara is not a typical woman character

usually portrayed in Malayalam cinema. She is not a shy village girl who would surrender herself in love before a man and then would spend her entire life in grief if she was cheated. Clara is very practical and ambitious. She boldly chooses the way of prostitution to save herself from her step mother. Tessa is also a departure from the conventional female protagonist. But, unlike Clara, Tessa is the victim of a brutal rape.

Tessa with the help of DK (Sathar) kills Hegde by poisoning him with a cobra. Next, she arrives in Cochin in search of Cyril while pretending to be a model. Later one night they meet in his studio but Cyril recognizes her and becomes angry. He beats her and verbally abuses her not because he knows she has a plan of revenge but thinks that she became a slut who does every 'adjustments' to flourish her career. But his frustration dissolves as he wants to enjoy her company. He reminds her she is a mere woman. She decides to take revenge, and her modus operandi is very striking. At night Tessa sedates him and penectomises him. When he regains consciousness she tells him that she has removed his male organ through a medical surgery. While Cyril finds himself in intense pain and bound to his bed, she taunts him so much to make him realise his faults and the gross wrongs he committed on her. But he doesn't yield and doesn't admit his life as a pimp is a fault. Then another twist happens when Tessa reveals Cyril that her appearance as a model is a disguise and she knows that she is still somewhere in his heart. She reminds him that she has only lost someone who cheated on her, whereas he lost someone who genuinely loved him. Now Cyril is stunned that he is not even able to face Tessa with whom he can argue if she is a model. Cyril recollects that her love was true and his love was overshadowed by his male supremacy concept and greed for wealth. He understands and admits his mistakes. Then Tessa leaves him but not before inviting him to settle the score with her, if any remains there. Cyril corrects his concept of her as she is the woman and accepts her challenge and tells her that he will confront her when he is ready, knowing that he has to settle the score with her in terms of true love. Tessa leaves for Canada and dismantles her cell phone and cuts further contact with DK who is after her to bed with her as a reward for his help in her plans.

It was a practice in cinema to present a rape victim in such a way that she may have to either marry the person to whom she lost her chastity or embrace death. This in fact results in the denial of proper rehabilitation to the rape victims. 'The fallen woman' finds it difficult to survive in the main stream society. She is denied of the rights of a woman. Even the right to live is denied as it is normal in cinema for a rape victim to meet with her death soon after the tragedy which happened to her. The very same 'chastity' which is demanded for women as a boon for the construction of a morally upright society becomes a curse as far as a rape victim is concerned. So a change becomes essential in the politics of representation in the portrayal of rape victims in cinema. A meritorious attempt is made in such a film like *22 FK* in bringing about a change in social perspectives. Tessa, instead of choosing death for her bravely decides to live a life of her own. A new paradigm is opened before a rape victim where she is given a chance to survive in the main stream society.

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Unveiling the Implicit Mystery in Chaplin's Attempt to Blend Comedy and Pathos:

A Study of *Modern Times*

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ABSTRACT

Charlie Chaplin films are often characterised by slapstick combined with pathos. It features a Tramp struggling against adversity. The poor little tramp is never a truly respectable person. He is very much funny looking, and the most noticeable is his face and costume. Many of Chaplin films contain social and political themes, as well as autobiographical themes.

The essence of Chaplin's humour is subtle satire. He was serious and funny at the same time and this blend of attitude elevated his comedy beyond film slapstick into eternal art forms.

Modern Times is a 1936 comedy film written and directed by Charlie Chaplin in which his iconic Little Tramp character struggles to survive in the modern, industrialized world. The film is a comment on the desperate employment and fiscal conditions created by modern industrialisation which many people faced during the Great Depression. Though the tramp is poor he is presented in the funniest way. This beautiful blending of poverty and comedy adds charm to his creation.

The present study aims at exploring Chaplin's treatment of humour in his movies with special reference to *Modern Times*.

this stage, they were provided with essential help for vocabulary and other language elements. A list of the queries made by the children was kept. An analysis of the vocabulary and the structures demanded by the children revealed that most of the students lacked the minimum vocabulary essential for expressing one's ideas at a secondary class level. In ten minutes time, the children demanded for equivalents in English- verbs (twelve queries), linkers (ten queries), auxiliaries (four queries), nouns (four queries) and pronouns (two queries). The stories were completed successfully with the help of the teacher. Conclusion While going through the third stage, it has been observed that most of the children started the story with a good opening sentence. There was improvement in the elements like structure, characterization, vocabulary and plot. They could also finish in time. It can be pointed out that if the process is repeated for a few more times, there could definitely be substantial improvement in the use of language for creative writing. The study brings into light, the effectiveness of self assessment, self study and need based development of language skills. In order to equip themselves for writing better stories, many students read English stories from children's magazines like Twinkle, Magic Pot, Children's Digest, Balarama, Tell Me Why, Thathamma etc. without being advised by the teacher. Some of them voluntarily took English library books for improving their writing skills. All these resulted in perfecting the stories when they attempted a second and third time. At this juncture, it should be noted that the children were found self motivated for language acquisition. This activity is planned and implemented in tune with Whole Language approach to the language acquisition where the language is acquired as a 'whole' not by splitting up into pieces.

ASSESSMENT OF THE ORAL SKILLS IN SCHOOLS AND COLLEGES

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ABSTRACT

The greatest curse of the modern educational system is the lack of harmony between what is taught and what is tested. Up-to-date methods are implemented, curriculum is innovated, but the question paper remains traditional and unchanged. Most of the questions in the communicative English paper give emphasis to the rules and regulations; practical oriented questions are ignored.

Language testing at any level is a highly complex undertaking that must be based on theory as well as practice. This paper presents the urgency of assessing the oral skills at the secondary, higher secondary and the undergraduate levels in India. The paper explores the language assessment system presently followed in CBSE (Central Board of Secondary Education), ICSE (Indian Certificate of Secondary Education), SSC (Secondary School certificate, Kerala Board) and IGCSE (International General Certificate of Secondary Education) Curriculum of University of Cambridge. An English test which assesses the four skills: Listening, Speaking, Reading and Writing was conducted among the students of Grade Nine and Ten of these curricula. The test was also conducted amongst the students of Arts and Science Colleges of the University of Calicut.

The information presented here is based on my study held at Dubai, Mysore and Kerala. Though the CBSE/SSLC/ICSE students are able to keep up their standard in Reading and Writing, they are not able to excel in Listening and Speaking. While IGCSE tests the four skills, other streams give priority to written skills- Reading and Writing. The paper establishes that the language assessment system focusing only on Reading and Writing is outmoded and need to be modified.

Key Words: assessment, oral skills, listening, speaking, reading, writing

1 INTRODUCTION

English was considered to be a library language in India. So only Reading and Writing were taught and strengthened. But with technological advancement and globalisation, English has become a world language linking the different parts of the world. Hence, the skills of Listening and Speaking also have to be developed properly. As T.C.Baruah (1984) states,

Oral communication is the most natural use of language and the natural process of learning the mother tongue begins with speech. It is therefore psychologically sound to begin a second language orally. (184)

A.W. Frisby and Robert Lado, experts in the field of English language learning, emphasise the importance of speech before writing. The English teachers struggle to strengthen their students' four language skills i.e. Listening, Speaking, Reading and Writing (LSRW). They incorporate it as the main objective in their lesson plan.

Listening is also an important skill, but unfortunately it is this skill that gets the least attention in English Language Teaching. Poor listening habits can result in failure of communication and ineffective expression of ideas. In the learning of the mother tongue, the child at first listens to the words uttered by the elders and imitates them which in fact develops his speaking skills. Then only Reading and Writing comes to the scene.

In real life, students even fail to understand an English announcement made at the railway station or airport. In order to comprehend such announcements, students should be trained to listen to varieties of speech with different accents and delivery pace. Advertisements, news broadcasts, poetry reading, songs with lyrics and telephone conversations can be recorded and used as listening exercises. There are many students in English classroom who hardly engage in classroom tasks and are reluctant to communicate orally. If there is a four skill assessment, teachers would take earnest efforts to make even the weakest student communicate orally on the fear of the poor grades which would be recorded. It would be an eye opener even for the students. The really successful teacher will be able to guide the students meticulously so that they can express their simple ideas in an error free language. Considering the distinctive nature of the language skills, Nelson Brooks strongly advocates that the four skills: Listening, Speaking, Reading and Writing must be tested separately and in various combinations. Brooks states,

Listening comprehension includes four types of items: phonetic discrimination, the completion of utterances, answers to questions, and long passages on a simple subject. The success of such tests has been due chiefly to the fact that they approach a normal use of language such as catching a name over the telephone, understanding a question that is casually asked in conversation, and comprehending what is said in a lecture hall or over the radio". (238)

Language is primarily speech and knowing a language is often defined as the ability to understand and speak language. Baruah states that the development of other skills, namely, Reading and Writing would be comparatively easy, if they are based on oral foundation. Baruah emphasises the need of testing oral skills:

It may not always be practicable to have oral tests at public examinations, but that should not reduce their importance in class tests. With a little bit of planning it is even possible to have oral tests in annual promotion examinations. This would provide a strong incentive for the pupils to learn the aural-oral skills, and for the teacher to teach these skills. Further, an oral test, though lacking in precision, is a quick and effective device for testing pupil's progress and difficulties.(290)

The acquisition of oral skills would not be a problem for students of affluent families because they get enough exposure to the language. But the middle class category relies only on their school teaching and testing in order to strengthen their language skills. With the advent of globalization, English has become the language of opportunities and the main motivation for the language learner is to communicate successfully. The technical and academic qualification one has mastered will become fruitless, if the oral proficiency is lagging behind. Large scale international tests of language proficiency such as those produced by Cambridge ESOL have a speaking component that aims to assess a candidate's ability to interact with another candidate and/or interlocutor.

Considering the linguistic incompetency of the graduates, the Government of Kerala has started a new programme to strengthen their communicative skills. It is Additional Skill Acquisition Programme (ASAP), a flagship initiative of Higher Education and General Education Departments of the Government of Kerala, envisaged to develop the four skills of students: Listening, Speaking, Reading, Writing. It is different from the traditional classroom learning and testing. At the end of 21 day training programme, students have to appear for an online exam in which their four skills are tested separately.

The communicative approach has introduced radical changes in syllabus, methodology and curriculum design. But evaluation has not gone through any practical change. Effective communication is possible only if the four skills LSRW are taught, strengthened and assessed. Due to the excessive emphasis rendered to the written skills (RW), the oral skills (LS) are often neglected. People are reluctant to converse in English even after years of English language learning. It is a fact that the skill of speaking is a complex one involving many sub skills. The assessment of students' oral proficiency has until recently received much less attention than tests of other abilities. The reason behind this is the fact that oral assessment differs significantly from other more conventional tests.

2 METHOD

A qualitative approach has been used to collect data by using classroom observations and checklists. Interviews with students, teachers, principals and members of various educational boards have helped the study considerably. A detailed study has been carried out on the language assessment system presently followed in the Grade X of CBSE (Central Board of Secondary Education), Kerala State syllabus –SSC (Secondary School Leaving Certificate), ICSE (Indian Certificate of Secondary Education) and IGCSE (International General Certificate of Secondary Education) Curriculum of University of Cambridge. An English test which assesses the four skills: Listening, Speaking, Reading and Writing was conducted among the students of Grade Nine and Ten of these curricula. The test was also conducted amongst the students of Arts and Science Colleges of the University of Calicut.

2.1. E2L Assessment in IGCSE

In IGCSE E2L students have three English examinations in 10th grade:

- a) **Oral communication:** The students are given a test card based on which they have to converse with examiner for nearly 15 minutes.
- b) **Reading and Writing:** Students have to comprehend passages, brochures, advertisements etc. which they have to do in their daily life too. Moreover they must do some creative writing in this paper.
- c) **Listening:** Students have to listen to the audio clippings and answer the questions provided in the question paper.

Students may choose core or extended paper depending on their calibre. The core paper is easier than the extended paper.

In IGCSE oral communication examination, there are 3 phases.

Phase-1: Warm-up.

Candidate is asked a few questions about herself/himself, the school etc. to give her/ him time to get used to the exam situation. This phase is not marked.

Phase-2: Initial Task.

The test card is given to the candidate to go through the instructions. The candidate is given a few minutes to prepare on the task. He/she is not supposed to make any written notes.

Phase-3: Development.

The candidate discusses his/her ideas and suggestion with the examiner.

2.2. Assessment in CBSE

In CBSE there is only one paper in English; it consists of four sections:

Section A: Reading

Section B: Writing

Section C: Grammar

Section D: Literature

The focus is given to Literature and Writing. Hence, Listening and Speaking are not tested. Literature can be considered as a comprehension passage given in advance to the students, the answer to which can be memorised even by weak students. Any student who mugs up the literature section will be able to get through the English examination.

2.3. Assessment in ICSE

In ICSE there are two papers in English.

- a) **English – I** is for two hours.

There will be 4 broad questions.

- A composition of 450 to 500 words
- A letter
- An unseen passage and related questions
- Questions to test grammar

- b) **English – II** is also for two hours, but purely based on literature

- Section – A (2 questions from As You Like It)
- Section – B (2 questions from Golden Lyre)
- Section – C (2 questions from Treasure Trove of short stories)

2.4. Assessment in SSC

In SSLC examination, there is only one paper in English. It includes questions from poem, passages, supplementary reader and language elements. In short, it gives importance to Reading and Writing; Listening and Speaking are neglected.

2.5. Assessment at the undergraduate level

At the undergraduate level, the curriculum has been revised and kept in balance with the international standard. A student studies six English papers during his / her graduation in University of Calicut. The papers are :

A01: *Communication Skills in English*

A02: Critical Reasoning and Presentation

A03: Reading Literatures in English

A04: Reading on Indian Constitution, Secularism and Sustainable Environment

A05: Literature and Contemporary Issues

A06: History and Philosophy of Science

The common course of the University of Calicut, A01: *Communication Skills in English* is aimed at the development of the four skills of the students. But unfortunately in the real sense it tests only writing. The main emphasis of the syllabus is the use of language in communicative situations. Some of the questions asked are purely based on theory. Though there are presentations and seminars to be held as part of the internal assessment, it becomes a monotonous activity of recollection.

It is unfortunate that even the pattern of NET/JRF examinations, the competitive examinations of University Grants Commission, is restructured and gives opportunities only to those students who can memorise the answers. The students are not given a chance to exhibit their language proficiency. Only objective type questions are included in the question paper.

3 RESULT

The tables below shows the result of the four skill assessment conducted as part of this project in various schools following SSC/CBSE/ICSE/IGCSE:

Table 1 LSRW of SSC Students

SSC				
GRADES	LISTENING	SPEAKING	READING	WRITING
A	1	18	36	7
B	29	52	32	32
C	70	30	32	61

Table 2 LSRW of CBSE Students

CBSE				
GRADES	LISTENING	SPEAKING	READING	WRITING
A	7	26	42	20
B	53	46	41	53
C	40	28	17	27

Table 3 LSRW of ICSE Students

ICSE				
GRADES	LISTENING	SPEAKING	READING	WRITING

A	28	35	23	66
B	41	30	64	25
C	31	35	13	09

Table 4 LSRW of IGCSE Students

IGCSE				
GRADES	LISTENING	SPEAKING	READING	WRITING
A	48	58	53	20
B	30	30	44	49
C	22	12	03	31

The real problem of English Language Teaching lies in the assessment system followed. The international standard in the assessment is compromised because of the constraints of time, energy and money. Assessment in many parts of the world has focused primarily on high stake examination. Writing a three hour theory examination is of no significance if it does not assess the four skills. While IGCSE tests the four skills, CBSE gives priority to written skills: Reading and Writing. In the language assessment system of CBSE/ ICSE/ SSC syllabi only Reading and Writing are tested, whereas IGCSE curriculum of University of Cambridge assesses Reading and Writing along with Listening and Speaking (LS). A child will be given a pass certificate in English only if he goes through all these assessments. But in other systems a student who can memorise some part of literature will be able to get through the examination.

It is a pity that students after 10 years of English language learning need to join some spoken English classes to learn speaking. They may be excellent in writing but the first impression of a man is formed through the words he utters rather than the words he writes. Instead of wasting time and money on spoken English classes and other English coaching classes, if a thorough teaching is given in high school levels, there would not be any need for students to join TOEFL and IELTS coaching centres. We usually begin our teaching operation with a semantic syllabus, carefully and scientifically drawn up to cover the students' communicative needs, yet utterly fail to teach how to communicate. This failure is due to the lack of proper assessment. Not only by bringing novelty in syllabus by redesigning and reorganising the teaching content in a semantic way would help the situation. The pains taken in curriculum framing and teaching methodology would be fruitful, if valuation is appropriate. Most of the teachers design their teaching based on the skills tested in an exam and its weight-age.

Assessing a student's oral performance is usually very subjective and as the interaction is fleeting, the marker often has to work under great time pressure while making their judgment about the speaker's ability. As Heaton points out:

Speaking is an extremely difficult skill to test, as it is far too complex skill to permit any reliable analysis to be made for the purpose of objective testing. (88)

Oral tests are totally different from other tests. In oral test people meet face-to-face and in many ways the people are more important than the testing instrument itself. Consequently assessors should adopt what Underhill (1998) has called a 'human approach'. In any testing situation, people must be treated as human being and, if possible, the test should be as enjoyable experience as possible.

4 CONCLUSION

Though the CBSE/ICSE/SSC students were able to keep up their standard in Reading and Writing, they were not able to excel in Listening and Speaking. Most of the students in CBSE had inhibitions and only very smart and confident students were ready to speak. Those students who excelled in speaking are the ones who get frequent exposure in the class. Since Listening and Speaking are not tested, they consider those skills irrelevant. CBSE students excel IGCSE students in Writing and it indicates that students' poor performance in Listening and Speaking is due to the lack of proper method of teaching and assessment in LS.

A change in the traditional mode of assessment is required. Most of the students of CBSE/ICSE/SSC preferred written assessments because it gave them ample time to organise and express their ideas. They stated that they hardly got time to speak in the classroom as the teachers were more concerned about completing the portions. Students were reluctant to speak as they refused to talk on the spur of the moment. Most of the students commented that the listening test conducted as part of this project was a unique experience.

Teachers strongly recommended that Listening and Speaking tests be included within the assessment system. According to them the greatest threat in the classroom was the teacher – student ratio which really limited the teaching learning process. Students lack creativity of expression which is fundamental in language learning. Students who excel in speaking were not able to excel in writing and vice versa.

Handling a mixed ability class is not easy because each student has his own interest, attitudes, level of intelligence, learning style and linguistic background knowledge. The teacher has to set a platform for her students to speak in English in each English class by reducing her own talking time and thereby increasing the Student Talking Time. Silence is important for students to work individually, to respond to a question, during explanations and monitoring of activities.

Testing and teaching are closely linked and one can influence the other either positively or negatively. The text books should be incorporated with cassettes providing ample listening exercises. Students should be made familiar with phonetics in lower grades itself as the language acquisition device is more active during the young age. This will build up confidence of students who are good at listening and weak at other skills. The students who have poor listening skills will get a chance to improve their skill. In India, English links different states. Though it is a foreign language, it is widely used. One big hindrance in our students obtaining excellent jobs is lack of poor communication skills. Four-skill-assessment will improve English competency. It will increase job opportunities and promote tourism. Language learning must be practical oriented. Or else, our students who have mastered Shakespeare will fail to comprehend the ordinary pamphlet and brochure and will be bewildered to speak in English, when they go for higher studies in Indian universities or abroad.

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Integration of Thinking Skills in Listening Activities.

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ABSTRACT

Listening skills activities are getting due weightage in school curriculum in the present scenario. Central Board of Secondary Education had made impressive strides in introducing Assessment of Listening and Speaking Skills.

While teaching listening, we introduce different strategies mainly for the sake of developing listening skills. Though thinking skills are used in listening activities strategically or unintentionally to some extent, it is much less than that is done in reading activities. Before the advent of audio visual media, we depended mainly on

SENSE IN NONSENSE: AN ANALYSIS OF NONSENSE LITERATURE AND NURSERY RHYMES

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Nonsense literature is a genre of literature where traditional rules, sublimity and logic associated with language and canonical literature are challenged with syntactic distortions, verbal jugglery and thematic subversions. The origin of this genre, which has no serious literary value attached to it is said to be rooted in 'informal' genres like the folktales and nursery rhymes, as well as in the more intellectual genres like satires and parodies. While '*Hey Diddle Diddle*' is cited as an example of the first category, Dryden's '*Mac Flecknoe*,' the well known mock heroic can, in a way, said to be a close example of the second kind. Nonsense literature as a genre gained popularity during the Victorian era and is in fact a combination of the above mentioned sources. This was made popular by the works of Lewis Carroll and Edward Lear. This is a unique kind of art form which basically aims at generating humour from nonsense. Contrary to popular notions there is more to this genre than just twaddle. It is not mere gibberish nor parody or satire, but a true and distinct art form which "both supports the myth of an informative and communicative language and deeply subverts it." Similarly nursery rhymes or "mother goose rhymes" are traditional songs meant to entertain little children. A careful study of select rhymes of this genre also reveals that there is more to them than their seeming simplicity and slapstick hilarity. The absurdity and ironical humour encrypted in these supposedly playful tunes is that many of them border on grotesque violence. This paper will be an attempt to unearth the 'seriousness' and 'significance' underlying the so-called nonsense and naiveté in nonsense literature and nursery rhymes respectively, with the help of select works. An attempt will also be made to highlight the comic elements and dark humour associated with them.

HERITAGE TRAITS OF MODERN KALADY

Abstract:

Geographical importance of Kalady in Ernakulam district of Kerala is related to the South Asia's cultural ethos and the development of landscape history. Here we discuss the river-valley local culture of the east of the Periyar River and its contemporary signpost. Even though the Euro-modern heritage lure in Kalady is relevant, that the nature of medieval principalities of this region should be investigated. In geohistorical sense, that the historical towns are often expression of gradual growth and self-regulation forms with the material culture. This paper depended on the productive interview with the local residents. The paper deals with the traces of the nineteenth and twentieth centuries' socio-historic phenomenon as 'modern'. Kalady is a fast growing cultural heritage tourism centre which attracts many tourists from far and wide. In recent times landscape studies are on an area which is perceived by many as featuring a rather homogeneous landscape, in spite of its geographical variability. It may lead to the future studies with worth complexities of modern scholarship.

Key words: Heritage Traits, Landscape history, Cultural Ethos, Geographical variability.

Dr. C.A. Anaz, & Dr. Omana.J



48. MANAGEMENT OF DIGITAL RESOURCES IN COLLEGE LIBRARIES USING CLOUD STORAGE

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Abstract

Information explosion in digital media warranted an increase in storage capacity of digital libraries. Use of cloud storage on Internet is becoming widespread, but it is not well harvested in libraries. Libraries are making advantages of latest technological developments very fast. They have been automated, networked and moving towards hybrid libraries. To overcome the problem of digital space scarcity in college libraries the new technology of cloud storage is very much helpful. Some online libraries make use of these services from outside providers. It is an outsourcing of digital storage which can be accessed from anywhere through a device connected to the Internet. Cloud storage technology should be adopted by all college libraries for their digital storage needs.

Keywords: Cloud Storage, Digital Resource Storage, College Libraries, Google Drive, SkyDrive, Box, DropBox

Introduction

Open spaces for collaborative learning and sharing ideas with a number of technologies are widely used instead of old-fashioned campus library that focused primarily on storing books, journals and periodicals. Many media options enhance teaching and learning process although books are still vitally important. The students make use of latest technology to better their reading and writing jobs. Students are very familiar with and always carry any of latest devices such as mobile phones, tablet, notebook and ipod. So the campus libraries should upgrade to support the needs of such users also. Long term media-rich activities should be planned. Wireless access to universe of knowledge is the need of the hour. The user community may be comfortable with latest tools but they may not know how to use them effectively and positively. The responsibility of an information centre widens in this areas too.

Cloud Storage

The emergence of e-publications, digital libraries, internet usage, web tools, applications for libraries, and consortium practices lead to the further developments in library profession. Cloud storage is an emerging computer paradigm where data and services reside in massively scalable data centers in the cloud and can be accessed from any connected devices over the Internet. No library uses the whole capacity of a computer; still they are worrying about lack of space. It is a universal phenomenon also. In a distributed environment we have lots of computer power and storage capabilities residing connected on the Internet. The cloud storage technology is only harnessing these capabilities which remain unused and make use of it for the sake of current user. A library can reserve a huge portion of storage on various locations on the cloud as a resource pool. These resource pools can be accessed with the help of any web enabled device through virtual servers.

Characteristics of Cloud Storage

The flexibility of operation is the main characteristic of cloud storage. The service can be used for small and heavy workloads. The cloud storage works in a fully virtualized environment. The Cloud services complies with Service-Level Agreements (SLA), it is that when the system experiences peak load, it will automatically adjust the situation by creating additional instances of the application on more servers to reduce the work load. The cloud storage is user-friendly and service oriented. Multiple customers can share the same document at a time because of its multi-tenancy feature. It has a self healing facility in case of any failure of application. There is always a hot backup which is ready to overtake the faulty application without any interruption.

Examples of Cloud Storage

Libraries can outsource or depend any of the cloud storage provider which are upcoming day by day. The popular ones which provide free use of cloud storage are:

1. Google Drive¹: Google drive is novice service from Google, which offers 5GB of free space for a customer with a Google account. A library can make as much number of accounts as per requirements and make use of the free service. Documents can be uploaded, updated, edited and synchronized to Google drive. Any device can be used because it supports with an android application. Notifications through email will help us to track with the updates. Sharing is easy by leading the customer to a link to the file.

2. Dropbox¹: Dropbox provide 2GB of free storage space which can be extended with a minimal cost. The storing in private folder allows the sharing through dropbox account holders while public folders can be shared with any customer. It is easy to use with the interactive interface and synchronizes very fast.
3. Box²: It also provides 5GB space on cloud for each account. The files can be viewed, edited, created and shared with the help of a mobile application. In box larger files can be stored and it offers highest security options. The synchronization can be done using Box sync component.
4. SkyDrive³: Microsoft offers 7GB of free space on SkyDrive for a windows user. The multi-user interface allows updating the documents simultaneously online by several users. It has Widows phone and iOS application and allows editing of the files within the browser, although the device is installed with the specific application software. It is less user friendly compared to other providers.

Use of Cloud Storage in College Libraries

Automated college libraries are storing their daily backups in a physical storage device like, CD-R, CD-RW, DVD-R, External Hard Disk, Pen Drive etc. The bibliographical data along with transactional data is to be backed up daily. It makes many problems like file writing errors, disk detection errors, scratch, storing of physical component, misplacement etc. Mostly used digital resources are also copied and shared more times to too many users. Some documents may be season oriented like model questions, previous questions, project reports etc. and can be used in the season only. This can be stored for next season. Here a college library can use the facility of cloud storage in an easy way. It reduces technology cost, increases capacity and reliability, and allows to introduce automated alert services. Libraries can put more and more contents into the cloud to enrich the digital library collection. Online catalogues, sharing of bibliographical data, scanned digital copy of historical and rare documents etc. are some of the possibilities of cloud storage. Library consortium can be developed easily with the help of cloud storage. The storing of large files gives stress to local servers which can be uploaded to cloud. It will improve the storage capacity of a digital library and integrates the collection with local and cloud storages. Library services like OCLC, Library of Congress, Exlibris, Polaris, Scribd, Discovery service, Google scholars, Worldcat, and Encore use the enormous opportunities of cloud storage for increasing their storage space.

Conclusion

College libraries are in a transitional stage with the advent of technological developments. Information explosion in digital media has warranted the increase in storage capacity of digital libraries. The cloud storage is a real boon to college libraries in storing digital resources including daily backup. It provides a service oriented architecture, user friendly environment and reduce information technology overhead to college libraries. Cloud storage infrastructure is a next generation platform which provides tremendous opportunities for libraries. It increases the quality of digital libraries and increases resource utilization with lesser cost. The innovation of cloud storage should be adopted by all college libraries for their digital storage needs

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Use of E-resources by Arabic College Students in Kerala

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Abstract

This study investigates the use of e-resources by the Arabic college students in Kerala. A structured questionnaire was used to collect data from a representative sample of 200 students of various Aided Arabic Colleges in Kerala. The study revealed that a few students are aware of e-resources. It is also found that the use of e-resources is not up to the expected level. The major reasons for this under utilization are the lack of awareness about e-resources, and the lack of technical know-how to access e-resources.

Keywords: E-Resources, Awareness, Usage, Arabic College Students, Kerala

1. Introduction

E-resources and e-learning are becoming increasingly important to all aspects, and all levels of education. The varieties of e-resources used by educational establishments from schools to the research institutions are vast. E-resources are those resources which include documents in electronic or e-format that can be accessed via Internet in digital library environment. E-resources are those electronic products that deliver a collection of data, be they texts, image collection, and other multimedia products like numerical, graphical mode for commercially available for library and information centers. These may be delivered on CD-ROM / DVD, over the Internet and so on. Providing access to E-resources is a service to help library users to find E-Databases, E-Journals, E-Magazines, E-Books, E-newsletters, E-conference proceedings and other information sources on a range of topic to prepare them for e-learning. Information in e-resources varies in language, media, and scholarly content. E-resources are available in Arabic language in good quantity and they are fast developing. Most of the e-resources in Arabic language are freely accessible and very rich in content. Unfortunately these resources are little used by the academic community in Kerala.

2. Review of Literature

A number of studies have been conducted on the area of e-resources. Mishra and Gohain (2010); Gireesh and Rajashekara (2009); Mendhe, Taksande, and Taksande (2009); Mathew, Sini and Sornam, S.Ally (2007); Eqbal and Khan (2007); Lohar and Roopashree (2006); Haneefa and Sreelatha (2006); Liew et.al. (2000); etc. have studied different aspects of e-resources, their awareness, preference, use etc. It shows that studies on e-resources in different languages are yet to be conducted. This study is an attempt to explore the awareness of Arabic College students about e-resources and their use by them.

3. Methodology

A structured questionnaire was used to collect data to assess the use of e-resources by the Arabic College students of Kerala. The tool comprised of 14 questions with suitable responses. Among the questions 5 were independent and the rest were dependent questions to the previous one. The study was conducted on a sample of 200 students comprising 32 Post Graduate, 91 Graduate and 77 Higher Secondary level students selected randomly from the total population of nearly 2000

students from 5 Postgraduate and 6 Degree Aided Arabic Colleges in Kerala. Among them 92 were male and 108 were female students.

4. Results and Discussions

The paper has attempted to study the use of Internet; means of Internet usage; problems in Internet use; awareness about online databases; use of online databases; awareness about online journals; and use of online journals by Arabic College students. The details are discussed below:

4.1. Use of Internet

Internet is getting high priority in education, information search and retrieval. It is considered as the major source of information for day-to-day work and education. Internet use is an indicator of awareness about computer, Internet and e-resources on Internet. The study revealed that most of the Arabic college students use Internet occasionally. Postgraduate students are the major group using Internet for academic purpose. Male students have a higher rank in use of Internet over female students.

Table 1 shows that student use of Internet is however very low contrary to what we expect from them.

Table 1 Use of Internet

Use Pattern	Category	N	%
Usually	Male	6	6.59
	Female	0	0
	PG	3	9.68
	UG	1	1.23
	HS	2	3.64
	Overall	6	3.59
Very Often	Male	15	16.48
	Female	15	19.74
	PG	3	9.68
	UG	19	23.46
	HS	8	14.55
	Overall	30	17.96
Occasionally	Male	47	51.65
	Female	32	42.11
	PG	19	61.29
	UG	36	44.44
	HS	24	43.64
	Overall	79	47.31
Rarely	Male	23	25.27
	Female	29	38.16
	PG	6	19.35
	UG	25	30.86
	HS	21	38.18
	Overall	52	31.14
Not at All	Male	1	1.09
	Female	32	29.63
	PG	1	3.13
	UG	10	10.99
	HS	22	28.57
	Overall	33	16.50

Present generation of people are accustomed to Internet and they do everything with the aid of Internet. In order to develop a culture of using Internet, we should promote the Arabic college students to use Internet for communication, information search and retrieval. Faculty and the library staff have a key role in achieving this end.

4.2. Means of Internet Use

There should be proper means to use Internet. Computer and Internet connectivity is basic for Internet use. Students from poor families may not have these at home. They have to depend on computer centre or library at their college or friend's home or café to use Internet. The study revealed that majority of the students depend the college library to use Internet.

Table 2- Means of Internet Use

Sl.No	Means of Internet Use	N	%
1.	Mobile/Laptop	20	11.98
2.	Private Room	4	2.4
3.	Public Room	23	13.77
4.	Internet Café	7	4.19
5.	Library	110	65.87
6.	Computer Lab	3	1.80

In order to maximize the use of Internet, the college has to provide maximum terminals in the library to use Internet. Faculty and library staff should guide the students to use Internet for getting necessary information for their study.

4.3. Problems in Internet Use

Students may face difficulties in using Internet. Their problems have to be identified and measures should be taken to overcome the problems. It will boost the use of Internet by students. Lack of training, lack of technical knowledge, lack of private space, financial difficulty, problems of protocol, computer illiteracy etc. are some of the problems in the use of Internet. The students were asked to list out their problems in using Internet and it was found that majority of the students had no serious problems in using Internet. However, lack of technical knowhow in using Internet was found to be a serious problem.

Table 3- Problems in Internet Use

Sl.No	Problems in Internet Use	N	%
1.	Lack of training	10	8.13
2.	Lack of Technical Knowledge	51	41.46
3.	Lack of Secrecy	1	0.81
4.	Financial Constrains	38	30.89
5.	Usage Protocols	4	3.25
6.	Unfamiliarity with Computer	4	3.25
7.	Misleading from desired information	14	11.38
8.	Rush at cubicles	1	0.81
9.	No Problems	77	38.50

Hands-on training in using computer and Internet is found necessary to strengthen Internet use. The library has to organize such training programmes to new entrants regularly so that problems in using computer and Internet can be reduced to the minimum.

4.4. Use of Online Databases

Online databases are very useful for academic community to get basic and current subject information required for academic work, for teaching and learning. Faculty and students are required to use these sources for having a better position in subject knowledge and results. Use of online resources is an indicator of good academic and research work. There is an increasing trend in using online databases by research scholars and writers in all subject fields and it is reflected in many citation studies. The study revealed that the Arabic college student community is using online databases at the minimum level.

Table 4 - Use of Online Databases

Use Pattern	Category	N	%
Usually	Overall	0	0
Very Often	Male	6	18.75
	Female	1	16.67
	PG	3	30
	UG	4	16.67
	HS	0	0
	Overall	7	18.42
Occasionally	Male	12	37.5
	Female	2	33.33
	PG	0	0
	UG	11	45.83
	HS	3	75
	Overall	14	36.84
Rarely	Male	14	43.75
	Female	3	50
	PG	7	70
	UG	9	37.5
	HS	1	25
	Overall	17	44.74
Not at All	Male	6	15.79
	Female	10	62.5
	PG	6	37.5
	UG	6	20
	HS	4	50
	Overall	16	29.63

Limited use of online databases is not a good thing for academic progress. Even the postgraduate students are not using the databases very often. This has to be taken very seriously and steps have to be taken to improve the situation.

4.5. Use of Online Journals

Online journals are found very useful in academic and research works. Awareness leads to the use of online journals. Greater awareness is a good indicator of adequate use of online journals. It also reflects in academic results. Some of the Arabic college students, especially postgraduate students are found to be the regular users of online journals in Arabic language and literature. Female students are very reluctant in using e-resources.

Table 5 - Usage of Online Journals

Use Pattern	Category	N	%
Usually	Overall	0	0
Very Often	Male	21	43.75
	Female	5	26.32
	PG	11	52.38
	UG	11	39.29
	HS	4	22.22
	Overall	26	38.81
Occasionally	Male	7	14.58
	Female	5	26.32
	PG	0	0
	UG	8	28.57
	HS	4	22.22
	Overall	12	17.91
Rarely	Male	20	41.67
	Female	9	47.37
	PG	10	47.62
	UG	9	32.14
	HS	10	55.56
	Overall	29	43.28
Not at All	Male	23	32.39
	Female	61	76.25
	PG	10	32.26
	UG	44	61.11
	HS	30	62.5
	Overall	84	55.63

The table reveals that majority of Arabic college students are not using online journals in Arabic language. Who is responsible for that? It is a serious matter that has to be studied in depth so that the use of online journals can be improved.

5. Conclusion

Present day students are very much IT literate and well versed in mobile based Internet services. E-resources are becoming the major source of information for education and research. Faculty and librarian should work hand in hand to introduce e-resources to students, train them to access and use and promote the use of Internet, databases, online journals etc. in academic and research works carried out. This will help develop an IT oriented, Internet/ database/ online journal using student community.

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Use of E-resources by IGNOU Post Graduate Students in Kozhikode: Need for Choice based Credit Courses in LIS

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Abstract—*The present study is an attempt to assess and evaluate the use of e-resources by IGNOU postgraduate students in Kozhikode. A survey with a structured questionnaire was used to collect data among students for the study and percentage method in Microsoft Excel was used to analyze data gathered. The study reveals that post graduate students are aware about e-resources, but usage was not much encouraging. Moreover, it is found that there is a need to provide timely training on how to use the e-resources to obtain relevant information and user awareness programme is needed for the distance education community to improve the proper usage of these e-resources. In view of the findings, study suggests for offering Choice Based Credit Courses for imparting Information Literacy, Library Literacy and Computer Literacy at UG & PG level for all courses irrespective of the subject specializations opted. In addition to this some suggestions have been put forward for the effective utilization of e-resources by the distance education students.*

Keywords: Awareness, World Wide Web, E-Resources, IGNOU, Internet

INTRODUCTION

Electronic information resources play a vital role in the higher education sector. Use of resources in the electronic environment becomes more pronounced when information becomes more readily available in the electronic format¹. Application of Computer Technology, networks, World Wide Web have radically changed the way in which information is acquired, stored, processed, organized, retrieved and disseminated². The University of London was the first university to offer distance learning degrees, establishing its external programme in 1858. The society to encourage studies at home was founded in 1873 in Boston, Massachusetts. There are many similar institutions around the world often with name open university and more than a dozen of them have grown to become 'mega universities', a term coined to denote institutions with more than 100,000 students like Indira Gandhi National Open University (IGNOU), the great Indian success story³.

There is a growing need to assess and evaluate the awareness and use of e-resources by distance education students and to find out what factors affect their use of electronic information resources. The e-resources are convenient source of specific information which students are increasingly using to complete their assignments and projects. As far as information retrieval concerned the web enables students a more personalized approach to gain information. In general, use of Internet, use of e-resources and web based information retrieval pattern are studied and discussed at different levels. This study provides an insight into awareness and use of e-resources by IGNOU post graduate distance education students in Kozhikode.

OBJECTIVES OF THE STUDY

- To assess the awareness of electronic resources among post graduate distance education students.
- To find out the frequency of use of electronic resources among post graduate distance education students.

- To identify the purpose of use of electronic resources among the students.
- To identify various hindrances faced by the students while accessing electronic resources.
- To examine the level of satisfaction of use of electronic resources.
- Analysis of data collected from 59 respondents are analyzed.

AWARENESS ABOUT ELECTRONIC RESOURCES

While looking at the awareness of electronic resources, survey result has highlighted that all post graduate students are aware and acquainted with electronic resources. Types of e-resources used are summarized in the Table 1.

Table 1: Awareness about Electronic Resources

Sl. No.	Types of e-resources	Respondents
1	E-journals	10 (16.95%)
2	Databases	33 (55.93%)
3	E-books	16 (27.11%)

Table 1 shows that 55.93 per cent of the post graduate students are familiar with databases, followed by E-books (27.11 per cent). Only 16.95 per cent of the post graduate students are aware and use of E-journals. This result shows that user awareness programme is needed for the distance education community to improve the proper usage of these e-resources.

FREQUENCY OF USE

The respondents were asked to indicate their frequency of using E-resources.

Table 2: Frequency of Use of Electronic Resources

Sl. No.	Frequency	Respondents
1	Daily	15 (25.42%)
2	2/3 times a week	5 (8.47%)
3	Once in a week	10 (16.95%)
4	Once in a month	29 (49.15%)

The data presented in Table 2 shows the frequency of use of e-resources. Out of 59 respondents, half (49.15 per cent) of the post graduate students use electronic resources 'Once in a month', followed by 25.42 per cent who are using 'daily', whereas, 16.95 per cent of the students use 'Once in a week' and only 8.47 per cent of post graduate students use electronic resources '2/3 times a week'. It means the usage of E-resources by the distance education post graduate students is not much encouraging.

PURPOSE OF USE OF ELECTRONIC RESOURCES

The post graduate distance education students' use of electronic resources for different purposes is shown in Table 3.

Table 3: Purpose of Use of Electronic Resources

Sl. No.	Purposes	Respondents
1	Searching subject databases	16 (27.12%)
2	For study purposes	40 (67.80%)
3	For official purposes	10 (16.95%)
4	Keeping up-to date in your knowledge	6 (10.17%)
5	Communication	20 (33.90%)
6	Carrier information	10 (16.95%)
7	Downloading programs and images	5 (8.47%)
8	Entertainment	9 (15.25%)

Table 3 indicates that majority (67.80 per cent) of respondents use e-resources for their study purpose where as a good number (33.90 per cent) of respondents use e-resources for communication purpose while 27.12 per cent use them for searching subject databases. However 16.95 per cent respondents use this for both official purposes and career information, while 15.25 per cent use for entertainment. Only a very few (8.47 per cent) respondents use e-resources for downloading programs and images.

ADVANTAGES OF USE OF ELECTRONIC RESOURCES

There are various advantages of e-resources over print resources, respondents were asked to indicate some of them and it is shown in Table 4.

Table 4 reveals that majority (62.71 per cent) of respondents opined that e-resources are easy to search and retrieve and 32.20 per cent responded that e-resources gives more up to date and correct information. However, 16.95 per cent indicates low cost of e-resources than that of printed one and 15.25 per cent opines that of speedy access make them to use e-resources.

Table 4: Advantages of use of Electronic Resources

Sl. No.	Advantages	Respondents
1	Speedy Access	9 (15.25%)
2	Low	10 (16.95%)
3	Less time consuming	5 (8.47%)
4	Easy to search and retrieve	37 (62.71%)
5	More up to date and correct information	19 (32.20%)

HINDRANCES FACED WHILE USING ELECTRONIC RESOURCES

The problems encountered by the respondents while accessing the electronic resources are depicted in Table 5.

Table 5: Hindrances Faced while using Electronic Resources

Sl. No.	Hindrances	Respondents
1	Lack of awareness about e- resources	22 (37.89%)
2	Lack of IT knowledge	14 (23.73%)
3	Difficulty in finding relevant information	20 (33.90%)
4	Inaccuracy of information	8 (13.56%)
5	Difficult in reading on screen	20 (33.90%)

Table 5 reveals that 37.89 per cent of respondents are facing 'lack of awareness about e-resources', followed by 'difficulty in finding relevant information' and 'difficult in reading on screen' (33.90 per cent), 'lack of IT knowledge' (23.73 per cent). In addition, the inaccuracy of available electronic information is the other problem encountered while accessing electronic resources.

SATISFACTION LEVEL

Respondents are asked to indicate the satisfaction level of use of electronic resources and are summarized in Table 6.

Table 6 reveals that majority (74.58 per cent) were partially satisfied with the use of e-resources, while 25.42 per cent had low satisfaction. From the table it is clear that none of them are highly satisfied with the use of electronic information resources.

Table 5: Satisfaction Level

Sl. No.	Satisfaction Level	Respondents
1	High	0
2	Low	15 (25.42%)
3	Partially	44 (74.58%)

CHOICE BASED CREDIT COURSES IN LIS

The National Knowledge Commission has called for reform of existing universities frequent curricula revisions, introduction of course credit system, enhancing internal assessment, encouraging research, and reforming governance of institutions in order to ensure quality in higher education.

Rapid changes in the education system, the increasing rate with which information is being published on the Internet, advances in the digital and internet technologies have made the world a global village. Conventional courses in different subjects have to address the needs of students to function efficiently in the ever changing Information environment. Students who are in the pursuit of finding jobs in a competitive environment should possess the necessary skills to fulfill the changing market demands. Universities, the frontiers of knowledge and education need to introduce Choice-Based Credit System wherein, the students can opt for additional courses to gain the required skills and competencies.

Many of the World's acclaimed Universities including universities in India are now offering various courses including-ICT skills, physical education, soft skills, life skills, women's studies etc., at Under Graduate and Post Graduate levels.

Some advantage of Choice-based Credit System include:

1. Learner Centred approach in place of teacher centric education.
2. Facilitates Credit Transfer.
3. Empowers students by offering choices to opt for courses of their interest.
4. Broadens the horizon of student's knowledge.

In the traditional class room environment, the students of any course either at UG or PG level have the opportunity to visit their respective library and get the required information from the library more easily than in the distance education environment. Hence, it can be said that a student of conventional system is more exposed to the library whereas a student of distance mode is deprived of such opportunity and therefore is expected to possess low level of Information Literacy, Library Literacy and Computer Literacy Skills.

Internet is a huge resource and searching the internet needs specialized search skills. Thousands of digital Libraries, millions of websites, open access resources are available on the Internet. Good knowledge of the search engines, formulation of effective search strategy and verification of the retrieved results for authenticity of the source are important for effective internet searching. In the absence of these skills, the user will be wasting lot of their productive time in identification and locating the required information. Librarians who are well trained in searching information can offer such choice based credit courses on Information Literacy, Library Literacy and Internet search skills which are very much required for the students to thrive in the present day information age.

CONCLUSION

All post graduate students are aware about electronic resources, mainly databases. But usage frequency of e-resources is not much encouraging. Lack of search skills for identifying, locating and retrieving electronic resources is the major hindrance faced by the post graduate distance education students while accessing e-resources. None of the post graduate students are highly satisfied with use of e-resources. In view of these findings, researcher suggests the need for the offering choice based credit courses in Library & Information Sciences at UG & PG level students.

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T04PP01

**A STUDY ON MALACOFAUNAL DIVERSITY OF VALLIKUNNU COMMUNITY RESERVE,
KADALUNDY ESTUARY, KERALA**

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The biodiversity of the southern coast of India is rich and much of the world's biological wealth is found in highly diverse coastal habitats. The present study was carried out on diversity and abundance of malacofauna of Vallikunnu Community Reserve, Kadalundy. The Kadalundy estuarine ecosystem is used as a homing environment by a wide variety of macrobenthos. A total of 60 species of molluscs were identified individually. 38 species of gastropods and 22 species of bivalves belonging to 44 genera. Majority species occurred in high numerical density and they were frequently observed throughout the period with insignificant variation with season but certainly influenced with tidal waves and zonal difference. The variation in the distribution of molluscs in the diverse habitats such as sandy zone, rocky zone, mangrove area, mudflats etc depicted the influence of habitat structure on molluscan diversity. *Perna viridis*, *Telescopium telescopium*, *Meretrix casta*, *Crassostrea madrasensis*, *Thais rodolphi* were the dominant species. Sewage disposal, sand mining, mangrove destruction, debris collection, fishing and mussel collection are major threats to mollusca family in the vallikunnu community reserve, Kerala.

Key words: malacofauna, macrobenthos, numerical density, gastropods, bivalves

08-43

Diversity and abundance of odonata and their association to habitat variables in kadalundi - Vallikunnu community reserve, mangrove forest ecosystem, South West Coast, Kerala, South India.

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INTRODUCTION

Mangroves are one of the ecologically important wetland ecosystems found in the inter-tidal zones of estuaries in tropics and subtropics (Tomlinson 1986, Ricklefs and Lantham 1993). Odonates are an important amphibiotic invertebrate group comprising damselflies and dragonflies. Odonates were the first insect group that has been globally assessed (Clausnitzer *et al.*, 2009). Studies on Odonates have been extensively carried out in India (Fraser, 1933, 1934, 1936; Prasad & Varshney, 1995, Subramanian. K.A, 2005; Emiliyamma, 2010 & 2012, Asaithambi. M, S.Manickavasagam, 2002, Kandibane. M *et al.*, 2003) but studies on their distribution and association with environmental factors especially in mangroves and estuarine ecosystem is scanty. Among the essential tools in ecological assessments in the land water interface characterization of the odonate communities (Dragonflies and Damselflies) has been a widely accepted tool (Sahlen and Ekestubbe, 2001; Chovanec & Waringer, 2001; Schindler *et al.*, 2003).

Dragonflies have been proposed as indicators to assess the ecosystem health of freshwater wetlands (Suhling *et al.*, 2006) and they are bio-indicators in natural ecosystems (Samways & Steytler, 1996; Chovanec & Waringer, 2001; Smith *et al.* 2007; Silva *et al.* 2010) and serve as an umbrella species in biodiversity conservation (Noss, 1990; Lambeck, 1997). Odonates require a wide range of functional and structural features of a particular habitat for their survival and reproduction (Tockner and Ward, 1998). Habitat heterogeneity especially the quality and quantity of aquatic and semi-aquatic plant communities, shoreline structures, hydrological features and sunlight are the most important variables determining the appearance of odonate species or associations (Lenz, 1991; Moore, 1991; Corbet, 1999). The site selection, seasonal variation and effect of salinity, air and soil temperature, pH on odonate assemblage have been studied.

MATERIALS AND METHODS

The Kadalundi estuary (11°7'28"– 11°8'01"N and 75°49'36"–75°50'20"E) is located at the mouth of the river Kadalundi that drains into the Arabian Sea on the west coast of Kerala (Plate 1 & 2). Before entering the sea, it divides into two channels encircling a small island. The raised sandbars on the western and southern sides of the island separate the lagoon from the fidgety sea. Apart from scattered patches of mangroves, the estuary is bordered by human

habitation and coconut groves. Around 8 ha of mudflats, exposed during low tides, offers potential foraging ground for several hundreds of wintering and resident water-birds, particularly waders (Aarif et al. 2011). It also provides significant socio-economic and livelihood services for the people around (fishing, oyster farming and sand mining). Two bridges, one each for road and rail, intersect the estuary on the western and eastern sides of the mudflats respectively.

It is covered with extensive patches of mangrove vegetation. Among the mangrove species found in the estuary, *Acanthus ilicifolius* is the predominant one followed by *Avicinia officinalis*. Most common mangrove associated species of plants are *Premna latitolia*, *Cerbera manghas*, *Callophyllum inophyllum*, *Morinda nerifolia* and *Derris trifoliata*. The area harbours rich faunal composition and an important stopover habitat of migrant species of birds.

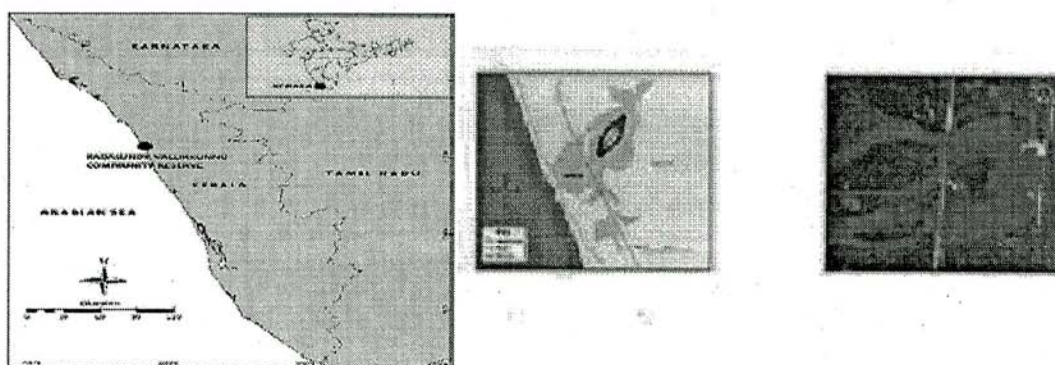


Plate-1 Location and satellite View of Study Area

Three vegetationally different areas were selected. Sampling was carried out from August 2004 to July 2006. Collections were done in four seasons namely winter, summer, monsoon and post monsoon. The samples collected between 9.00 am and 12.00 pm once in a week. Three selected sites named as site I (area is surrounded by rich mangroves) site II (rich in vegetation with less mangrove patches) and site III (low natural vegetation with disturbances). Odonate species were observed visually and sample collections made with insect catching nets. Collected and photographed species were identified with the help of standard pictorial guides (Subramanian, K.A., 2005, Emiliyamma, K.G et.al, 2005). Physico-Chemical parameters such as air temperature, Soil temperature PH and salinity also recorded. Relative density and ANOVA test were used for analysis.

RESULTS AND DISCUSSIONS

A total of 605 individuals of 23 different species of odonates belonging to 4 different families and 9 subfamilies were recorded (Table 1). Odonates belonging to the family Libellulidae dominate in all the sites in all seasons. Libellulidae were relatively diverse (78.26%) with 18 species followed by Coenagrionidae (13.04%) with 3 species. Only one species each was observed from the families Lestidae and Aeshnidae.

The odonate assemblage and species evenness varied according to the structure of the sites. Maximum number of individuals is seen in site II (n=378). This area is being protected and

disturbance is least with sufficient undergrowth that imparts high abundance of odonate species. Sufficient light and warm climate probably factors contributed high species richness and density of the species since they are light loving creatures. Corbet and May (2000) observed a strong correlation between warm conditions of the habitat and odonate assemblage. The low salinity of water also favours high abundance of this group. High salinity, less ground vegetation and disturbances in the areas I (n=114) & III (n=113) reduces the dispersal and preference to these sites. Being as an indicator of environment, odonates are sensitive towards their surroundings and changes in their ambience may lead to the changes their status (Sunit Kr. Das *et al.*, 2012). The life cycle of odonates directly correlated with water parameters especially salinity. They show some preferences to specific habitats and their distribution are very much involved in various microhabitats (Sheldon, G. and K.E. Walker, 1998). The most dominant species recorded from the study area I were *Orthetrum sebina sebina* and *Rhyothemis variegata variegata*. *Acisoma panorpodes panorpodes* and *Neurothemis tullia tullia* were dominant in the study area II while *Neurothemis tullia tullia* and *Acisoma panorpodes panorpodes* were abundant in the third site.

Table 1: List of Odonates recorded

S.No.	Sub order	Family	Sub Family	Scientific Name
1	Zygoptera	Coenagrionidae	Psuedagrioninae	<i>Ceriagrion cerinorubellum</i>
2	Zygoptera	Cocnagrionidae	Psuedagrioninae	<i>Ceriagrion coromandelianum</i>
3	Zygoptera	Coenagrionidae	Psuedagrioninae	<i>Psuedagrion microcephalum</i>
4	Zygoptera	Lestidae	Lestinae	<i>Lestes elatus</i>
5	Anisoptera	Aeshnidae	Aeshninae	<i>Anax guttatus</i>
6	Anisoptera	Libellulidae	Sympetrinae	<i>Nurothemis tullia tullia</i>
7	Anisoptera	Libellulidae	Sympetrinae	<i>Nurothemis fulvia</i>
8	Anisoptera	Libellulidae	Sympetrinae	<i>Acisoma panorpoides panorpoides</i>
9	Anisoptera	Libellulidae	Sympetrinae	<i>Brachythemis contaminata</i>
10	Anisoptera	Libellulidae	Sympetrinae	<i>Bradinopyga geminate</i>
11	Anisoptera	Libellulidae	Sympetrinae	<i>Crocothemis servilia servilia</i>
12	Anisoptera	Libellulidae	Sympetrinae	<i>Diplacodes trivialis</i>
13	Anisoptera	Libellulidae	Sympetrinae	<i>Rhodothemis rufa</i>
14	Anisoptera	Libellulidae	Trithemistinae	<i>Trithemis festiva</i>
15	Anisoptera	Libellulidae	Trithemistinae	<i>Trithemis pallidinervis</i>
16	Anisoptera	Libellulidae	Libellulinae	<i>Lathrecista asiatica asiatica</i>
17	Anisoptera	Libellulidae	Libellulinae	<i>Orthetrum sabina sabina</i>
18	Anisoptera	Libellulidae	Libellulinae	<i>Orthetrum pruinosum neglectum</i>
19	Anisoptera	Libellulidae	Trameinae	<i>Rhyothemis variegata variegata</i>
20	Anisoptera	Libellulidae	Trameinae	<i>Tholymis tillarga</i>
21	Anisoptera	Libellulidae	Trameinae	<i>Zyxomma petiolatum</i>
22	Anisoptera	Libellulidae	Urothemistinae	<i>Aethriamanta brevipennis</i>
23	Anisoptera	Libellulidae	Brachydiplactinae	<i>Brachydiplax chalybea chalybea</i>

Of the 23 species, *Acisoma panorpodes panorpodes* (RD- 15.87) was most abundant species (n=96), followed by *Neurothemis tullia tullia* (RD = 14.71) with species evenness 89 and *Brachythemis contaminata* (RD= 11.9) with number of individuals 72 (Table 2). *Lestes elatus* with relative density of 0.33. The *Anax guttatus* observed only once, from study area II probably due to the paucity of aquatic vegetation. Normally it prefers to reside in open pond and lakes with abundant aquatic vegetation. *Pseudagrion microcephalum* is the migratory

species. It migrates in large numbers with *Pseudagrion decorum* along the West coast, during October and September.

In all seasons odonates are widely distributed. The frequency of occurrence of odonates varied according to the season without significant changes in the species richness. However the species equitability considerably varied ($P = 0.035$). Out of 23 species 22 species were observed during rainy months and minimum of 12 species during winter season. Maximum number of individuals was observed during post monsoon (236) and Monsoon months (155). The number of individuals reduced during summer (127) and winter (87) months (Fig. 1-5). The seasonal variation probably due to availability of bushes was high during monsoon months and they are flying from sub marginal plants to plants as well as some water plants. Habitat structure, such as marginal vegetation, is very important for all dragonfly species (Niba & Samways, 2006).

The odonate assemblage can be probably credited to structure and composition of habitat and water parameters. Stagnant water and slow moving water bodies might impart better breeding locations of many odonate species (Bond et al., 2006). The frequency of odonates was high in study area II irrespective to the seasons. All Odonates are found close to fresh water although adult dragonflies often venture out for some distance over land, foraging for food (Kandibane. M et al., 2003).

Rapid and distinct seasonal changes of different environmental parameters effectively determine the species composition and the distribution pattern of organisms (Jayachandran. P.R et al, 2013). The air and soil temperature attained maximum during summer months and gradually decreased towards rainy months. A decreasing trend in salinity from summer months towards rainy months attributed the variation in the assemblage of odonate species in the selected sites. The environmental parameters such as air temperature and soil temperature significantly vary over seasons. The air temperature ($P = 0.025$) and soil temperature ($P = 0.001$) have a significant effect on the abundance of Odonates in different areas of Community Reserve.

Table- 2. Distribution profiles of Odonates

S. No	Scientific name	Frequency of Sightings			Total	Relative Density
		Site1	Site2	Site3		
1	<i>Ceriagrion cerinorubellum</i>	3	33	13	49	8.1
2	<i>Ceriagrion coromandelianum</i>	0	7	3	10	1.65
3	<i>Pseudagrion microcephalum</i>	0	17	2	19	3.14
4	<i>Neurothemis tullia tullia</i>	8	57	24	89	14.71
5	<i>Orthetrum sebina sebina</i>	17	11	2	30	4.96
6	<i>Acisoma panorpoides panorpoides</i>	2	75	19	96	15.87
7	<i>Orthetrum puinosum neglectum</i>	6	8	7	21	3.47

8	<i>Rhodothemis rufa</i>	9	17	1	27	4.46
9	<i>Rhyothemis variegata variegata</i>	16	15	2	33	5.45
10	<i>Zyxoma petiolatum</i>	0	2	0	2	0.33
11	<i>Trithemis pallidinervis</i>	14	13	0	27	4.46
12	<i>Trithemis festiva</i>	3	0	1	4	0.66
13	<i>Neurothemisfulvia</i>	2	11	2	15	2.48
14	<i>Diplacodes trivialis</i>	8	22	9	39	6.45
15	<i>Brachythemis contaminata</i>	6	48	18	72	11.9
16	<i>Brachydiplax chalybea chalybea</i>	7	18	0	25	4.13
17	<i>Lathrecista asiatica asiatica</i>	1	6	1	8	1.32
18	<i>Tholymis tillarga</i>	5	5	3	13	2.15
19	<i>Bradinopyga geminata</i>	0	3	1	4	0.66
20	<i>Aethramanta brevipennis</i>	3	2	2	7	1.16
21	<i>Cocothemis servilia servilia</i>	4	5	3	12	1.98
22	<i>Lestes elatus</i>	0	2	0	2	0.33
23	<i>Anax guttatus</i>	0	1	0	1	0.17

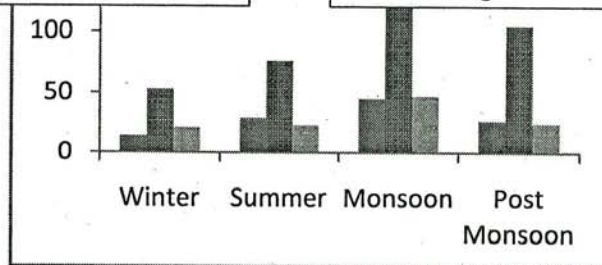
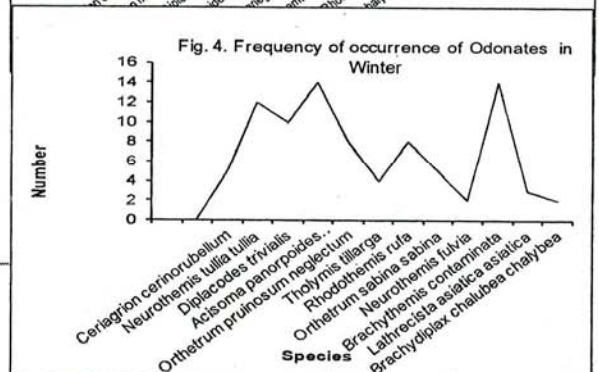
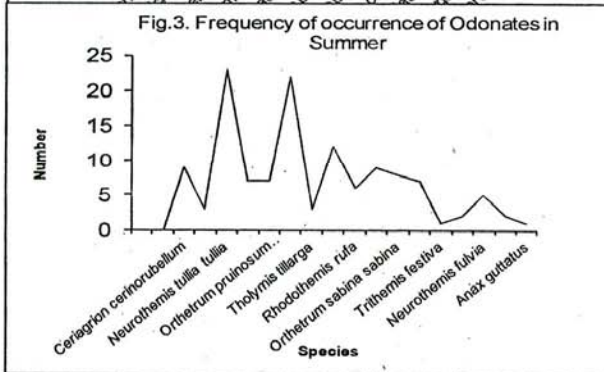
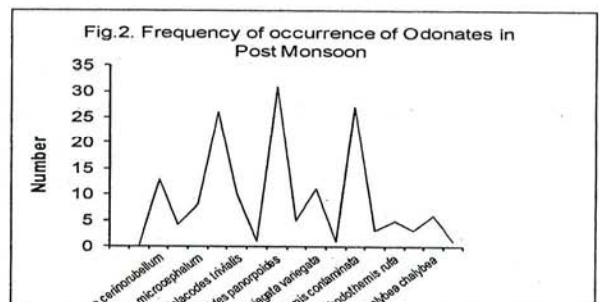
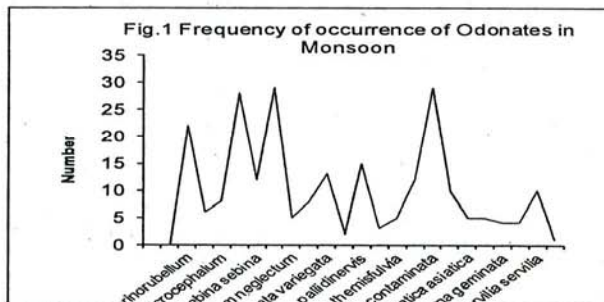
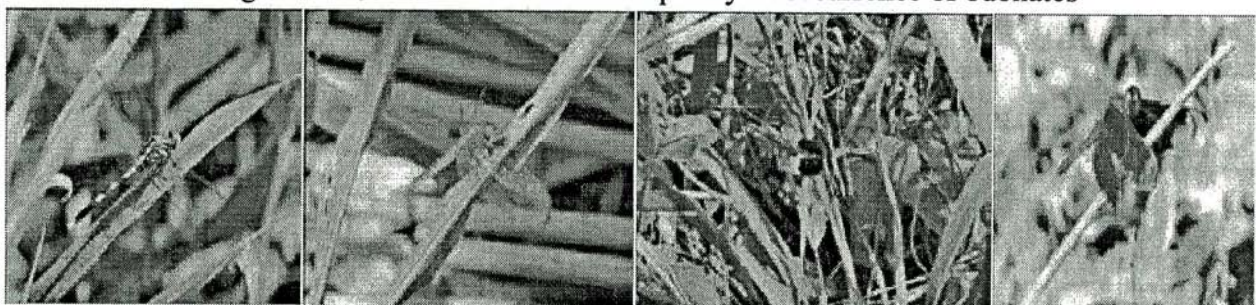


Fig. 5 Seasonal variation in the frequency of occurrence of Odonates



Orthetrum Sabina Sabina *Cocothemis servilia* *Neurothemis tullia tullia* *Neurothemis fulvia*

The human pressure like destruction of mangroves, husk retting, sand mining, sewage disposal, mussel collection, construction works, were major factors that can contribute the loss of biodiversity especially one of the most sensitive group of animal kingdom, performing major role in trophic level for the sustenance of a healthy ecosystem. A minor perturbation in the structure of the habitat negatively affects entire floral and faunal composition especially if it is a most complex fragile estuarine mangrove ecosystem. Further studies are recommended since this area is getting more protection after the declaration as Community Reserve, the first of its kind in India.

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Kadalundy Community Reserve- Stopover Habitat for Avian Migrants, Conservation Concern

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Abstract

Conservation of migratory birds necessitates protecting suitable stopover habitat along migratory routes as well as destination habitats. The diversity and various components that determine the composition of avian group was subjected to comprehensive analysis and objective study at the Kadalundy Bird sanctuary, first national community Reserve. Main recourse has been made to direct observation and total count method. Among the total species observed, 91.59 % species were distant migrants, 1.46% local migrants and 6.93 % were residents. The percentage of occurrence of sea birds was higher than Shore birds and terrestrial birds. The physical and biological aspects were taken into consideration for frequency studies in terms of presence and abundance of birds. The availability of mudflats got exposed by low tide, water level, abundance of macrobenthic organisms have a significant control on habitat selection of feathered bipedal at Kadalundy.

The Charadriiformes reach the estuary by the month of September and their frequency become high during November and started to decline by the end of July. For migratory birds, timing of arrival on the breeding grounds can strongly influence breeding success through improved access to higher quality resources and breeding locations and increased numbers of potential breeding attempts. Among Shore birds, Lesser Sand Plover and Greater Sand Plover were dominant and Brown headed Gull and Black headed Gull contributed bulk proportion among Sea birds. The anthropological interference affected the estuarine bed, mangroves considerably decline density and abundance of different fauna, avian migrants in particular. The loss of mudflats reduced the availability of macrobenthos led to the fall in migrant species. The human pressure like destruction of mangroves, husk rutting, sand mining, sewage disposal, mussel collection, construction works, were major factors that contributed decline of the migrants. Hence stopover habitat is indispensable for conservation of winter migrants.

Key words: Charadriiformes, Estuary, Mangroves, Macrobenthos



T04PP09

BRACHYURANS DIVERSITY IN KADALUNDY AND KORAPPUZHA ESTUARIES, WEST COAST OF KERALA, INDIA

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Brachyurans are relatively unexplored estuarine resource and very little information is available on brachyuran residing estuaries of Kerala. This paper discusses diversity, abundance and habitat preference of brachyurans in the Kadalundy and Korapuzha estuaries located at the Northern Districts of Kerala. The Kadalundy estuary is a part of the Kadalundy Community Reserve, the first of its kind in India, located in between the Malappuram and Kozhikode Districts of North Kerala. The Korapuzha is a short and shallow estuary located in the Kozhikode District, North Kerala, India. A simple method of handpicking, digging out the burrows as well as application of dilute formalin inside the burrows were used to collect crabs from the intertidal region and sub-tidal region of different floodplain ecosystems of the estuaries. Crabs were also collected with the help of locally available thread nets and round nets and from the catches of inshore fishermen. The study revealed that brachyuran assemblage varied with nature of microhabitat. A total of 17 species of crabs, belong to 11 genera and 5 families have been recorded from Kadalundy and Korappuzha estuaries. Of the two sites, maximum diversity was recorded at Korappuzha estuary (10 species) followed by Kadalundy estuary (8species). The species like *Uca annulipes* (Latreille), *Metapograpsus messor* (Forsk.) were dominant in Kadalundy while *Scylla serrata* (Forsk.), *Grapsus strigosus* (Herbst) and *Ocypoda ceratophthalma* (Pallas.) contribute bulk of the brachyurans in the Korapuzha estuary. In both of the estuaries *Scylla serrata* (Forsk.) have been fished extensively, is emerging as an export oriented trade potential. Size regulation and ban on the capture of females, prohibition on disturbances and protection of estuarine environs should be the measures taken to conserve the crab resources of these estuaries.

Key words: *Uca annulipes*, *Metapogrpsus messor*, *Scylla serrata*, Estuary

64. STUDIES ON THE BUTTERFLY DIVERSITY OF KADALUNDI VALLIKKUNNU COMMUNITY RESERVE MANGROVES, SOUTH WEST COAST OF INDIA

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Studies on the butterfly diversity of the Kadalundi Vallikkunnu community reserve mangrove are very sporadic in spite of their importance. As such in the present investigation an attempt has been made to study the diversity of butterflies in this mangrove community. The study was conducted a period of nine months covering monsoon, pre-monsoon and post monsoon seasons by using all the possible sampling methods. Random sampling method was adopted for the study. The collected butterflies were killed, preserved and identified. The study revealed 32 different species of butterflies. The important species are under the families of Nymphalidae, Lycaenidae, Pieridae and Papilionidae.

Key Words: Mangroves, Butterflies, Kadalundi, Forests.

65. ICTHYOFAUNAL DIVERSITY AND THEIR DISTRIBUTION IN TRIBUTARIES OF CHALIYAR RIVER -WESTERN GHATS

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The Western Ghats is a region of high biological diversity and endemism of terrestrial fauna, but very little is known about its freshwater species distribution. Freshwater fishes distribution and diversity status of tributaries of Chaliyar River at different zones were studied from September 2011 to June 2012. 49 species of fishes belonging to 33 genera and 27 families were collected

and identified. Cyprinids dominated with 14 species followed by the family Ambassidae and Bagridae with 3 species each. Two species each from Belonidae, Aplocheilidae, Clupeidae, Lutjanide and Cichlidae and 19 families with a single species each.. Fish communities displayed a continuous distribution with a gradual increase in richness towards upstream regions. 25 species have been observed from the upper region while lower region contributed 19 species. In the upper belt, habitat is so productive because of variant stream flow, organic deposit, diversity in substratum and canopy cover. Presently, the Chaliyar River and its tributaries are under severe ecological degradation due to anthropogenic interferences like sand mining, excessive fishing, wrong fishing practices and waste deposition. It is necessary to implement urgent management plans for the conservation of freshwater fish fauna of Chaliyar River.

Key words: *Western Ghats, Endemicity, Chaliyar, Sand mining, freshwater*

66. FLUCTUATIONS IN SECRETION OF THE MANDIBULAR ORGAN RELATED TO REPRODUCTION IN A CONTINUOUSLY BREEDING MANGROVE CRAB (*SESARMA QUADRATUM*) DECAPODA: AN ULTRASTRUCTURAL STUDY

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The present work depicts the results of our electron microscopic study on the mandibular organ (MO) of the mangrove crab, *Sesarma quadratum* (Brachyura: Decapoda) in relation to stages of ovarian maturation viz., early (Stage I and II), mid (Stage III) and late (Stage IV and V) stages of vitellogenesis. The study revealed a progressive increment in the size of MO in tune with the

A preliminary study on Malacofauna along Chaliyar River Basin

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Abstract

River Chaliyar is one of the West flowing rivers of Kerala originating from the Illambari hills of Tamilnadu. A study was conducted from December 2010 to July 2011 in Chaliyar River Basin to document Malacofauna of the area. During the study, 17 species of molluscs belonging to 15 families were recorded. Among them, 9 species were gastropods and 8 species were bivalves. In the upstream region, the species *Lymnaea luteola* was dominant. In the middle stream region, *Lamellidans marginalis*, *Pila virens*, *Villorita cyprinoidea* were the dominant species. The species *Meretrix casta* was very abundant in the down stream region. It was observed that in fresh water, the diversity and distribution of mollusc was scanty where as they were rich in estuarine habitat. This study was an humble attempt to document the Malacofauna along the Chaliyar river basin which may help in further conservation and management activities in these areas.

Key words: Malacofauna, Chaliyar river, estuary, conservation

Introduction

Mollusca is the second largest animal phylum next to arthropoda which comprises more than 10,000 living species. The phylum is divided into seven classes, namely Aplacophora, monoplacophora, scaphopoda, Gastropoda, Pelecypoda, polyplacophora and cephalopoda. Molluscs are widely distributed in both time and space. They may be found on land, in fresh water and in the sea. In ocean they occur in three zones, viz, benthic, pelagic and littoral. The maximum number of species occurs in the littoral zone. Very few are benthic or pelagic. Many species are seen in the south eastern coast of India (Hornell, 1922, 1951). Each species has a specific pattern of distribution eg: *Trochus*, *Conus*, *Bursa* etc occur in the mesolittoral zone. The predominance of a species at a place mostly depends on the feeding ground, temperature and the water quality. Depending on the substratum, the various habitats where shells occur can be classified as sand beaches, rocky shores, mud-flats, mangroves and coral reefs. Many species are seen in the sunderbans mangroves (Nandi & Chaudary, 1983). There is scarcely any portion of the world without molluscan life, except in regions of extreme cold.

The Western Ghats, as a potential bio-geographic tract or territory, has gained the acclaim of one among the 34 globally identified biodiversity hotspots. The Western Ghats form one of the watersheds of India, feeding the perennial rivers. Almost all the torrential streams at an altitude of 1500-2000m harbour several species of aquatic insects, fishes, molluscs etc in their specialized microhabitats. Chaliyar is one of the west flowing rivers originating from the Western ghats and experiences 3 different seasons, the north east monsoon from September to December, dry season from January to may and south west monsoon during june to august. Altitudinal gradient ranges from 11 to 2066m above mean sea level. Originating from the Illambari hills in Tamilnadu it flows 169km towards west emptying into the Arabian Sea.

Rajendra G. Mavinkurve *et.al.* (2004) have been studied the land and fresh water molluscs of Western ghats. During their studies for the last three and a half years they were able to report 190 species of land snails

with twenty new reports for the region. But the alarming factor is that twelve genera reported earlier were not encountered in their survey.

They were able to record forty species of fresh water molluscs and three new reports from the region. In this scenario the present study is quite significant and is a humble attempt to study the molluscan diversity of Chaliyar River. It also may help in further conservation activities in these areas.

Materials and Methods

The study was carried out from October, 2011 to June, 2012 along the Chaliyar River, which is one of the west flowing rivers originating from the Western ghats and experiences 3 different seasons, the north east monsoon from September to December, dry season from January to may and south west monsoon during june to august. Altitudinal gradient ranges from 11 to 2066m above mean sea level. Originating from the Illambari hills in Tamilnadu it flows 169km towards west emptying into the Arabian Sea. The samples were collected twice in a month. For the easy collection of specimes, the study area is divided in to three regions. These regions includes; upstream region (Nedumkayam and Chaliyar mukku), middle stream region (Vavoor and Vettupara) and downstream region (Kallai).

Most of the molluscans are sufficiently large and conspicuous. So they were easily handpicked. Both dead and live specimens were collected and the shell fragments discarded. During the collection care has been taken to collect the live specimens. The leaves and branches of plants carefully searched out and the snails were picked with hand.

Since shells are the main criteria for identification, shells were also collected. To obtain small species, weeds were shaken out under the water. Bivalves are benthic forms, lived partly buried in the soft bottom and they were collected by dredge. Under the rocks are keenly observed. Proper care has been taken to reduce the disturbances of the molluscs. Maximum care is taken to avoid the damage to soft body parts. And the relevant data were noted from the field. After the collection, shelled molluscs are kept in a container of fresh water and closed the mouth of the container, tightly. The animal residing inside the shells will be asphyxiated. After that, specimens were thoroughly washed and they were kept in 70% alcohol for few hours. Then the specimens were washed thoroughly and dried properly.

The collected specimens were identified with the assistance of scientist, Ashokan (CMFRI, Calicut) and Muhammed Jafer Palot (Assistant Zoologist, Z S I, Calicut). The pictorial, *The book of Indian Shells* (Deepak Apte, 1998) and *Hand book of Indian fresh water molluscs* (Ramakrishna, Anirudha Dey, 2007) were also used for the identification.

Results and Discussion

A total of 17 species of molluscs were identified from the study area and they were belong to 16 genera; Class gastropoda with 9 species and bivalves with 8 species. 17 species of molluscs identified were comes under 15 families (Table 1). From the upstream region of Chaliyar, 5 species were identified (table 2). They were noticed throughout the study period. In the up stream region of chaliyar; *Thiara rudis* (thiaridae), *Bellamya bengalensis* (viviparidae), *Paludomus annandalei* (Pleuroceridae), *Lymnaea luteola* (lymnaeidae) and *Indoplanorbis exustus* (Planorbidae) were identified. Presence of these species reflects that the up stream region is highly pure.

3 species were obtained from the middle stream region (Table 2). The species found in this region are; *Lamellidens marginalis* (unionidae), *Villorita cyprynoides* (corbiculidae) and *Pila virens* (ampullariidae), in which *Lamellidens marginalis* and *villorita cyprynoides* were dominant. Highest number of molluscs were obtained

from the lower stream region. And the identified species of this region includes; *Babylonia spirata* (Buccinidae), *Turritella duplicata* (Turritellidae), *Bursa tuberculata* (Bursidae), *Donax scortum* (Donacidae), *Paphia species* (Veneridae), *Meretrix meretrix* (Veneridae), *Arca species* (Arcidae), *Perna viridis* (Mytilidae) and *Meretrix casta* (Veneridae). *Perna viridis* and *Meretrix casta* were dominated in the down stream region (Table 2). In this 3 species namely; *Meretrix meretrix*, *Meretrix casta* and *Paphia species* coming under the same family, Veneridae.

The Western Ghats are home to 257 terrestrial molluscs with relative endemism of 73% demanding priority for conservation planning. The terrestrial habitats are exclusively inhabited by the class gastropoda and fresh water habitats by gastropoda and bivalvia. Molluscs play a significant role as links in food chains as detritus feeders, improving bottom sediments and soil condition. Some molluscs are habitat specialists.

Molluscs are richly seen in estuaries. From the downstream region, 9 species were obtained. Estuary provides greater support to number of species. From the down stream region, 9 species were recorded. They are *Babylonia spirata*, *Turritella duplicata*, *Bursa tubercula*, *Villorita cyprinoides*, *Donax scortum*, *Paphia species*, *Meretrix casta*, *Meretrix meretrix*, *Arca species* and *Perna viridis*. *Meretrix casta* was dominant in the down stream region. The identified molluscs fall under the classes gastropoda and bivalvia. Among them 9 species were gastropods and 8 species were bivalves. Subba Rao (1989) revealed the presence of 19 gastropod species from Kerala. More number of species were identified from the down stream region, which connection with the sea, it flows to the Arabian sea and meets at "estuary".

There are 5070 species of marine and non marine molluscs living in the wild India. In which 3371 species are marine forms and 1671 species are non-marine. This includes 1488 terrestrial species in 140 genera and 183 fresh water species in 53 genera. Molluscs have high economic importance. Extractions of some species like *Villorita cyprinoides* and *meretrix casta* are used as anti viral drugs (Anil Chatterji *et.al*, 2002). Some species like *lamellidens marginalis*, *perna viridis*, *paphia species* etc are edible. Edible mussel *Perna viridis* of the family mytilidae is a food resource of great potential. The distribution of these molluscs is likely to influence the availability of food. Seasonal changes have great influence on the diversity and distribution of malacofauna in tropical and subtropical waters. Aquatic macro invertebrates play a significant role in responding to a variety of environmental conditions of rivers and streams and therefore may be used as bio-indicators for water quality assessments. Now the use of benthic macro invertebrates as bio-indicators is gaining more importance as these can be easily caught and seen with naked eyes.

Bivalves are notorious for their ability to bio-concentrate pesticides and heavy metals. *Villorita cyprinoides* is a best example for this (Siva Prasad, 2007). Extensive harvestation from the wild population could be the potential threat of these species. Large scale mining causes a serious threat to aquatic fauna by destructing their breeding ground. The Chaliyar River is polluted by Birla group since last many decades. Macro benthos living in the river was exposed to the chemical pollution. The double impact alleged to have problems to aquatic organisms as the result of discharge of toxic effluents from the Gwalior Rayons factory (Grasim industry) to the river. But the impacts of sulphides are still remaining. According to Ramakrishna and Dey (2007), *Bellamya bengalensis* can tolerate a maximum level of salinity 0.2 mg/ml. Presence of *Bellamya bengalensis*, *Indoplanorbis exustus*, *Thiara rudis*, *Paludomus annandalei* etc in the up stream region of Chaliyar river shows that the upper region is highly pure. Even then, their diversity is affected due to anthropogenic activities.

Table 1: List of Mollusc species recorded from the study area.

SI No	Species	Genera	Family	Order	Class
1	<i>Babylonia spirata</i>	Babylonia	Buccinidae	Neogastropoda	Gastro poda
2	<i>Bellamya bengalensis</i>	Bellamya	Viviparidae	Mesogastropoda	
3	<i>Pila virens</i>	Pila	Ampullariidae	Mesogastropoda	
4	<i>Thiara rudis</i>	Thiara	Thiaridae	Mesogastropoda	
5	<i>Paludomus annandalei</i>	Paludomus	Pleuroceridae	Mesogastropoda	
6	<i>Lymnaea luteola</i>	Lymnaea	Lymnaeidae	Basommatophora	
7	<i>Indoplanorbis exustus</i>	Indoplanorbis	Planorbidae	Basommatophora	
8	<i>Turritella duplicata</i>	Turritella	Turritellidae	Mesogastropoda	
9	<i>Bursa tuberculata</i>	Bursa	Bursidae	Mesogastropoda	
10	<i>Lamellidens marginalis</i>	Lamellidens	Unionidae	Unionoida	Bivalvia
11	<i>Villorita cyprinoides</i>	Villorita	Corbiculidae	Veneroida	
12	<i>Donax scortum</i>	Donax	Donacidae	Veneroida	
13	<i>Paphia species</i>	Paphia	Veneridae	Veneroida	
14	<i>Meretrix meretrix</i>	Meretrix	Veneridae	Veneroida	
15	<i>Meretrix casta</i>	Meretrix	Veneridae	Veneroida	
16	<i>Arca species</i>	Arca	Arcidae	Arcoida	
17	<i>Perna viridis</i>	Perna	Mytiloidae	Mytiloida	

Table 2: Check List of Molluscs recorded from the study area

Sl. No	Species	Family	Site 1	Site 2	Site 3
1	<i>Babylonia spirata</i>	Buccinidae			✓
2	<i>Bellamya bengalensis</i>	Viviparidae	✓		
3	<i>Pila virens</i>	Ampullariidae		✓	
4	<i>Thiara rudis</i>	Thiaridae	✓		
5	<i>Paludomus annandalei</i>	Pleuroceridae	✓		
6	<i>Lymnaea luteola</i>	Lymnaeidae	✓		
7	<i>Indoplanorbis exustus</i>	Planorbidae	✓		
8	<i>Turritella duplicata</i>	Turritellidae			✓
9	<i>Bursa tuberculata</i>	Bursidae			✓
10	<i>Lamellidens marginalis</i>	Unionidae		✓	
11	<i>Villorita cyprinoides</i>	Corbiculidae		✓	
12	<i>Donax scortum</i>	Donacidae			✓
13	<i>Paphia species</i>	Veneridae			✓
14	<i>Meretrix meretrix</i>	Veneridae			✓
15	<i>Meretrix casta</i>	Veneridae			✓
16	<i>Arca species</i>	Arcidae			✓
17	<i>Perna viridis</i>	Mytilidae			✓

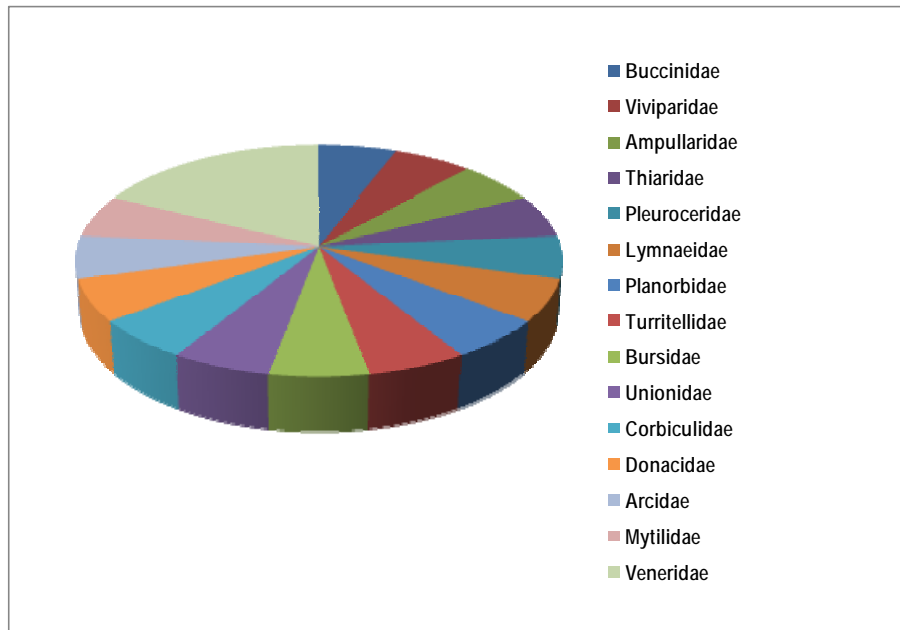


Figure 1: Species diversity of Molluscs by family

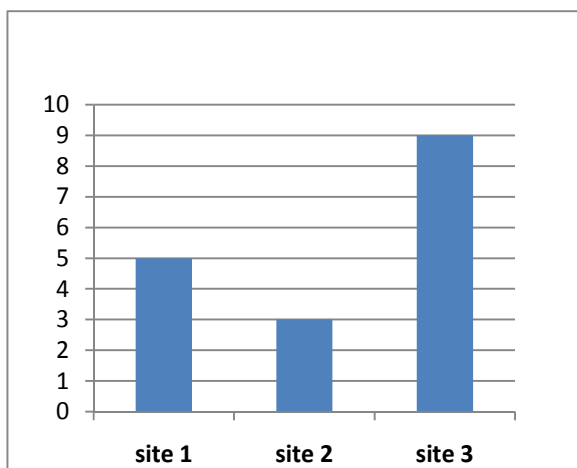


Fig. 2: Species diversity of Molluscs in different sites

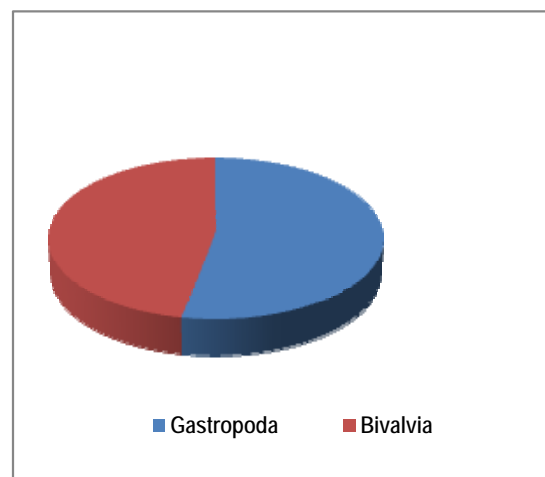


Fig. 3: Species diversity of Molluscs by class



Babyloniaspirata



Bellamyabengalensis



Pila virens



Paludomus annandalei



Thiara rudis



Lymnaea luteola



Indoplanorbis exustus



Turritella duplicata



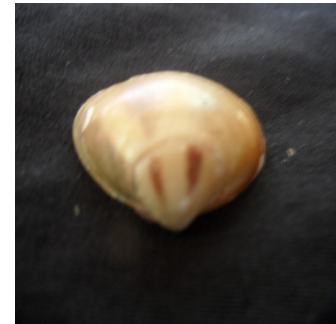
Bursa tuberculata



Lamellidens marginalis



Villorita cyprinoides



Meretrix casta



Meretrix meretrix



Arca species



Perna viridis

Conclusion

Chaliyar and its tributaries act as a complex ecosystem. Any alteration in this ecosystem upsets natural equilibrium. Sewage disposal from houses and industries, sand mining, fishing, over harvesting of edible molluscs etc are the serious threats faced by the molluscs of Chaliyar. Chaliyar also receives a lot of pollutants from different sources like domestic sewage, slaughter house waste, waste disposal from nearby industries etc. This may change characteristics of water and it adversely affects the living beings as well as entire ecosystem. Now the molluscan species are facing serious threats due to pollution, uncontrolled harvesting of edible species, large scale sand mining etc. Therefore it is necessary to make continuous census. So that they can be accessible for scientists who are interested in developing management plans to protect aquatic resources. Thus, this paves many prospects for future study.

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the *Myristica* swamp 16.3 % are endemic to Western Ghats and 24.2% of the vertebrates recorded are red listed. Grading of 15 *Myristica* swamps based on habitat quality and human disturbances showed that out of the 15 swamps sampled 2 swamps could be classified as 'least disturbed', 11 swamps as 'disturbed' and 2 as 'severely disturbed'. The swamps need immediate attention in the form of scientific conservation, management and monitoring without alienating the local human population.

69. DRAGONFLIES AND DAMSELFLIES OF NEDUMKAYAM AND VAVOOR AREA OF CHALIYAR RIVER – A PRELIMINARY STUDY

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Odonates are one among the most fascinating and elegant group of insects usually found near water bodies. Their presence, diversity and relative abundance indicate the overall well being of an ecosystem. Study areas selected are Nedumkayam and Vavoor of Chaliyar river, Kerala. Nedumkayam is notable for its rich rain forests with a splendid variety of flora and fauna. It forms an integral part of Nilgiri Biosphere Reserve. The Poonkudipuzha of Vavoor area is often disturbed by humans for domestic purposes and sand mining. During the study period (February – June, 2011), 29 species were observed. Among them 17 species come under the family Libellulidae (Dragonflies). 5 families of Damselflies were observed, including Coenagrionidae, Platycnemididae, Calopterygidae, Chlorocyphidae and Euphaeidae. Since the number of species collected from Vavoor area was much lower than the Nedumkayam, protection of this natural habitat is important.

Key words: *Chaliyar river, Odonates, Sand mining, Ecosystem*

EV-OP32**PARACALANIDAE, THE MOST ABUNDANT EPIPELAGIC CALANOID COPEPOD CONTRIBUTING TO SECONDARY PRODUCTION IN BAY OF BENGAL**

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Key words: *Paracalanidae, Mixed layer, EEZ, Bay of Bengal*

ABSTRACT

Paracalanidae, the Calanoid copepod family though small in size are the main herbivores in the mixed layer of the pelagic realm. They form efficient consumers of small sized diatoms in estuaries and coastal waters. The study of copepods from the Exclusive Economic Zone (EEZ) collected during the Marine Research-Living Resources (MR-LR) of Regional center, National Institute of Oceanography, Kochi during 1999-2000 forms the material for this study. Usually these copepods escape in 330 mesh but are filtered in the 200 mesh zooplankton net. Paracalanus indicus, P. aculeatus, Acrocalanus monachus, A. longicornis and A. gibber were the dominant copepods in the mixed layer during summer monsoon, winter monsoon and inter monsoon spring. The distribution of the species in relation to seasons and coastal and oceanic stations are discussed. Statistical interpretations are also dealt.

INTRODUCTION

Copepods are numerous and abundant and they may sometimes form up to 90–97% of the biomass of marine zooplankton. Therefore, copepods are an important link in marine food webs and marine economy (Bradford–Grieve *et al.*, 1999). Planktonic copepods constitute the bulk of the biomass in most pelagic zooplanktonic communities and are important food source for higher trophic organisms including krill and fishes (Nybakken, 2005). Copepods from Bay of Bengal was studied by Stephen, 1984 and 1992 Madhupratap (1983), and Fernandes *et al.* (2009). Globally there is a drive to create database for zooplankton for forecasting fishery like the Coastal and Oceanic Plankton Ecology, Production and Observation Database (COPEPOD- O'Brien, 2005). The survey made during Marine Research on Living Resources (MR-LR) is important because it alone provide time-series zooplankton collections which were lacking in Indian Ocean especially in the Bay of Bengal. This paper describes the spatial and seasonal distribution of the Paracalanidae species collected in twenty two stations from BoB in 1999, 2001 and 2002 and also from the Andaman Sea.

EXPERIMENTAL

The study is based on the samples collected during 5 cruises carried out in the Bay of Bengal and Andaman Sea. Samples were collected from the Exclusive

Economic Zone (EEZ) as a part of multi-disciplinary project entitled *Marine Research – Living Resources (MR-LR) Assessment Programme* of the Regional Centre, NIO – KOCHI, funded by the Ministry of Earth Sciences – (MoES), Govt. of India through the Centre for Marine Living Resources and Ecology (CMLRE). Samples were collected onboard *FORV Sagar Sampada* with a Multiple Plankton Net (MPN) of 200 mesh size. Copepods were sorted out from the samples for their quantitative qualitative analysis. The species level identification of copepods. Identification was made up to the species level following the works Sewell (1947-48), Kasthurirangan (1963), Bradford (1994) and Tanaka (1965, 1973), Gopalakrishnan. T.C (1982), Grice.G.D & K. Hulseman (1966), Brodsky, K.A (1950).

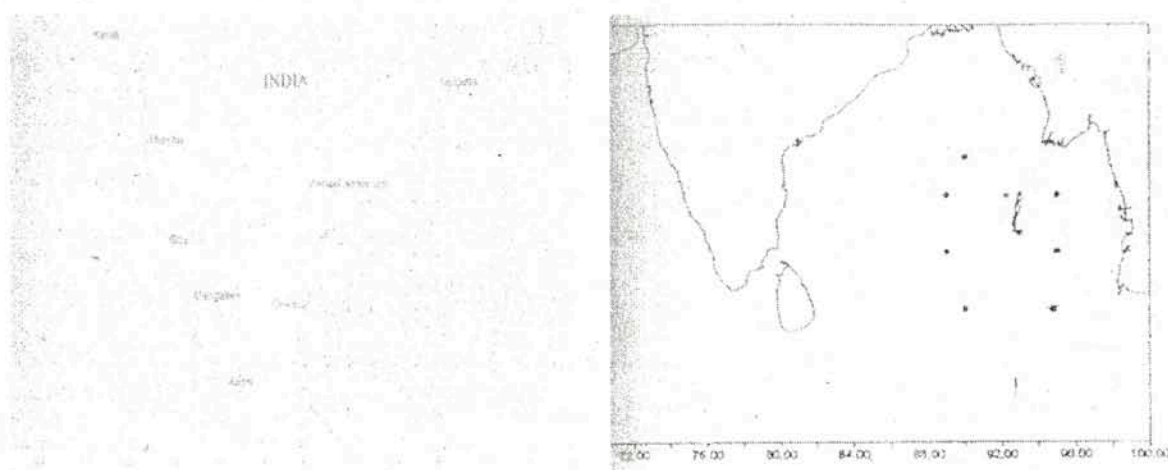


Fig. 1 – Location of Stations in Bay of Bengal and Andaman Sea

RESULTS & DISCUSSION

The copepod species analysed from the water samples of the BoB during 3 seasons and from the 5 stratified depths consists of 5 orders viz., Calanoida, Harpacticoida, Cyclopoida, Mormonilloida and Poecilostomatoida. A total of 2,55,566 copepods were analyzed during the study period from which 277 species were identified which comprises 35 families and 89 genera. A total of 265 species had their percentage composition less than 1% and 12 species constitute nearly 75% of the copepods of the BoB. *Acrocalanus* and *Oncea venusta* dominated out of 98467 copepod analyzed from the mixed layer. The Thermocline layer was dominated by *Corycaeus spp*, *Oncea venusta* and *Acrocalanus*. *Corycaeus spp* and *Paracalanus spp* dominated the BT-300 layer where as the 300-500 layer was dominated by *Corycaeus spp*, and *Pleuromamma indica*. The deeper layer were dominated by *Corycaeus spp*. The *Paracalanidae* consists of 29.6%, 21.6%, 17.97%, 4.62% and 0.54% respectively in 5 depth strata from mixed layer to the bottom layer. A total of seven species viz., *Paracalanus acculeatus*, *P. indicus*, *P. parvus*, *Acrocalanus gibber*, *A. gracilis*, *A. longicornis*, *A. monachus* were identified from the family *Paracalanidae* during the study period from BoB. The *Paracalanidae* were obtained from every samples at every station from the mixed layer and from the thermocline layer. The BT-300 layer acted as a barrier layer

which separated the upper two layers from the lower two layers. It acted as a barrier layer and only 3% of total copepod analysed was obtained from this layer. Family paracalanidae significantly correlated with the density of water column during Spring inter monsoon, Summer monsoon, and Winter monsoon. Sea surface salinity also showed direct correlation with the Paracalanidae.

SPECIES	Table. 1 -Percentage Composition of Different Copepod Species at 5 Depth Strata Of The BoB											
	TT-0	%	TT- BT	%	BT-300	%	300-500	%	500-1000	%	TO TAL	%
<i>Cosmocalanus darwini</i>	1076	1.09 0758	1813	1.462 533	0	0	42	0.43 0946	152	1.165 19739	3083	1.20 6342
<i>Oithona plumifera</i>	1498	1.51 8546	3045	2.456 378	85	0.83 6203	25	0.25 6515	180	1.379 83902	4833	1.89 1097
<i>Corycaeus danae</i>	1910	1.93 6197	2985	2.407 977	0	0	230	2.35 9943	0	0	5125	2.00 5353
<i>Pleuromamma abdo- minalis</i>	965	0.97 8236	3971	3.203 375	496	4.87 9488	326	3.34 4962	191	1.464 16251	5949	2.32 7774
<i>Euchaeta rimana</i>	2155	2.18 4557	4282	3.454 257	120	1.18 0521	19	0.19 4952	2	0.015 33154	6578	2.57 3895
<i>Pleuromamma indica</i>	1300	1.31 783	3479	2.806 483	1056	10.3 8859	961	9.86 0456	410	3.142 96665	7206	2.81 9624
<i>Subeucalanus pileatus</i>	2334	2.36 6012	4799	3.871 316	430	4.23 0202	378	3.87 8514	197	1.510 15715	8138	3.18 4305
<i>Paracalanus</i>	2632	2.66 8099	7380	5.953 389	899	8.84 4073	25	0.25 6515	10	0.076 65772	10946	4.28 3042
<i>Paracalanus acculeatus</i>	12637	12.81 032	5080	4.097 997	0	0	80	0.82 085	0	0	17797	6.96 3759
*	6541	6.63 0714	16901	13.63 391	1045	10.2 8037	943	9.67 5764	1774	13.59 90801		10.6 4461
<i>Acrocalanus</i>	13908	14.09 876	14300	11.5 357	927	9.11 9528	345	3.53 9914	60	0.459 94634	29540	11.5 5866
<i>Corycaeus</i>	11084	11.23 602	17435	14.06 468	1080	10.6 2469	1532	15.7 1927	2235	17.13 30011	33366	13.0 5573
<i>Oncaea venusta</i>	16995	17.2 281	16286	13.13 779	425	4.18 1013	157	1.61 0917	970	7.435 79916	34833	13.6 2975
All other sps	23612	23.9 3585	22207	17.91 422	3602	35.4 3532	4683	48.0 5048	6864	52.61 78612	60968	23.8 5607
Total	98647	100	123963	100	10165	100	9746	100	13045	100	255566	100

*Indicate immature, unidentified and broken parts of copepods

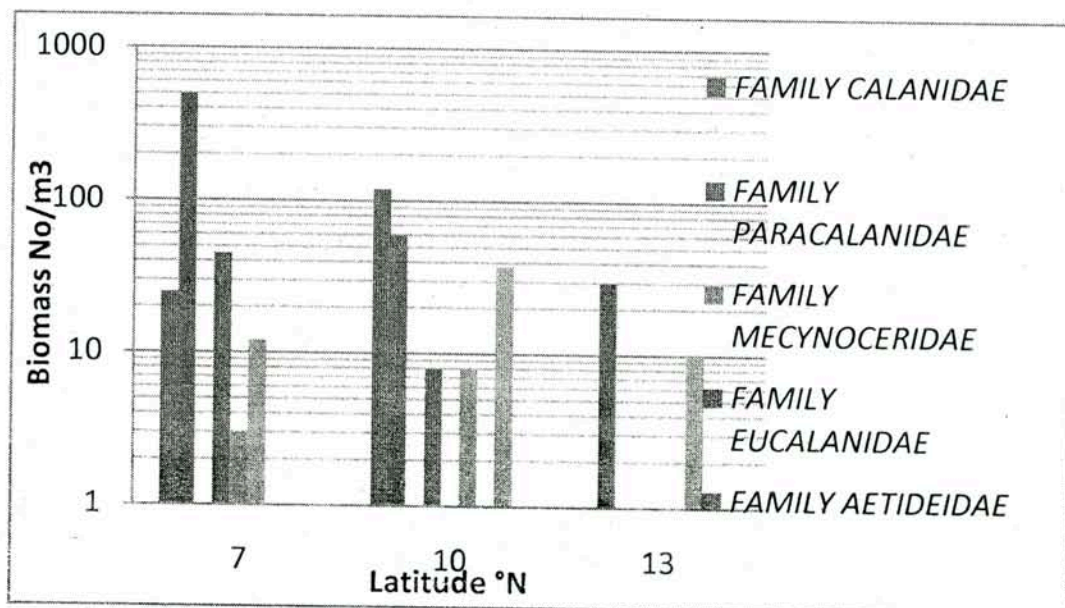
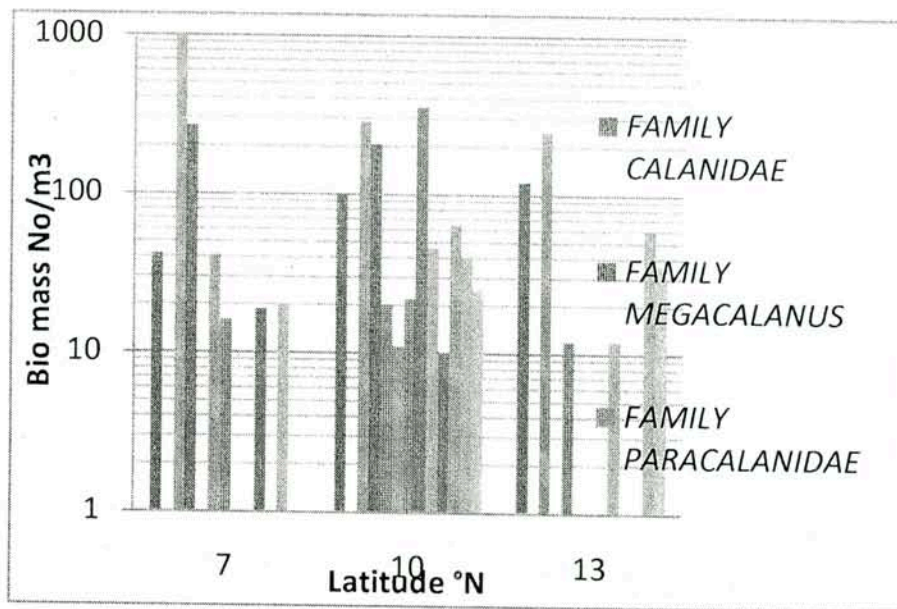


Fig1 &2 :Distribution of copepod families in the eastern and western side of the study area

From the figures it was evident that fine filter feeders and herbivorous copepods such as *Paracalanus*, *Acrocalanus* sp and *Corycaeus* spp contribute to the abundance in our waters of EEZ

CONCLUSION

The study reveals that species of the family Paracalanidae though small in size contribute a major portion of the secondary production in the EEZ. In the coastal waters the group is the most abundant copepod as seen in the distribution in Andaman waters. Since these copepods are small usually they escape through .333mesh net. The 200---^M mesh used in the MPN could retain the Paracalanidae so that their significance in the zooplankton economy is highlighted in this account.

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Preliminary survey of soil macro and meso Arthropods along Chaliyar river banks

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Abstract

A great variety of organisms exist in the soil and litter above it. The diversity of animals that inhabit in different soil type is so complex. The major role of soil organisms is their participation in soil formation, humification and decomposition. The present study was carried out in 3 different habitats along Chaliyar from November 2011 to June 2012 to explore the diversity of soil arthropods. Soil samples were collected from different habitats by once in a month. A total of 114 specimens of soil arthropods were collected from three different habitats belonged to four major arthropodan classes with thirteen different orders. Class *Insecta* was the prominent group comprising seven orders with seventeen different families. *Coleoptera* was the most prominently represented order comprising six families. Second dominant order was *Hymenoptera*, followed by *Hemiptera*. Remaining orders viz. *Diptera*, *Dictyoptera*, *Orthoptera* and *Thysanura* exhibited comparatively lesser diversity.

Key words: Chaliyar, *Insecta*, *Coleoptera*, *Hymenoptera*, *Hemiptera*, *Diptera*, *Dictyoptera*, *Orthoptera*, *Thysanura*.

Introduction

The soil is an extremely dynamic, complex and highly heterogenous system that allows the development of an extremely large number of ecological habitats. It is the home of an array of complex soil fauna that perform important function for the ecosystem. (Gardi and Jeffery,2009). The most dominant group of soil organisms are microorganisms (fungi and bacteria), followed by huge variety of animals such as nematodes,arthropods,enchytraeids and earthworms(Jeffery *et al* ,2010). According to Hole(1981)there are at least twelve kinds of activities by which the soil animals affect the soil. The most dominant group of soil organisms are microorganisms (bacteria and fungi), followed by huge variety of animals such as nematodes, arthropods, enchytraeids and earth worms(Jeffery *et al*,2010). In the soil these organisms have central functions in organic matter decomposition, the nutrient cycle, the enhancement of soil structure and control of soil organisms including crop pests (Moore and Walter,1988). They also contribute to the regulation of atmospheric composition and climate,water quality and quantity and the reduction of environmental pollution (Lavelle *et al*, 2006). In Kerala, a detailed study was not yet happened about the diversity of soil dwelling forms. Biodiversity studies of soil dwelling organisms in mangroves was reviewed by Sunil kumar (1999). The relationship between soil organisma and agriculturalfield was studied by Kerala land use board (1995) and Kumar (2005 & 2006). A recent study on soil macrofaunal assemblage in selected land use system was conducted by Mujeeb Rahman(2010). Chaliyar is one of the major and the fourth longest river in Kerala that originates from the Western Ghats and enriched with diverse flora and fauna. Even though the biodiversity studies on the riparian habitats of Chaliyar and its tributaries are very much limited. Hence a preliminary survey was under taken to investigate the soil macro and meso arthropods along three different habitats of Chaliyar river banks.

Methodology

The study was carried out along the banks of three major tributaries of Chaliyar river viz. upper stream with forest ecosystem (Nedumkayam and Chaliyarmukku - Plate 1) middle stream with open field (Vavoor and Vettupara) and the lower stream with bushes and shrubs (Paruthippara) between November 2011-June 2012. The soil samples with litter fauna was collected in polythene bags from the above selected areas with the help of a shovel and immediately brought to the laboratory. The collected sample is subjected to extraction through Berlese funnel method (Plate 1). Specimens were collected in specimen tube with 70% alcohol which is placed under the tip of extraction funnel. Collected specimens were transferred separately into separate specimen bottles and preserved in 70% alcohol for further studies. In the present study the identification was made only up to the order and family level.



Study area - Nedumkayam



Berlese Funnel Apparatus

Results and Discussions

Organic matter decomposition in soil is performed by a dynamic system of soil fauna and their synergistic interactions play a very important role in enhancing the nutrient release (Banerjee, 1972, Bhandari and Somani, 1994). Saprophagous soil animals are the "key" for mobilization of nutrients "locked" in microbial and higher plant tissues. (Gupta and Sekhon, 1994). Proper understanding on the contribution of different faunal groups to the ecosystem process are required for developing environmentally sound management practices and strategies to safeguard the biodiversity and soil fertility. For that adequate taxonomic foundation is needed on which ecologists can work, and more particularly good identification is needed in studying various aspects of the soil fauna.

In the present study a total of 114 specimens of soil arthropods collected from the three study areas along the Chaliyar river banks which belonging to four major arthropod classes and 13 different orders (Fig. 1, Table 1). Out of the 114 specimens collected, 73 belong to Class Insecta, which are classified up to the family level. A total of 17 families of insects belonging to seven different orders were recorded from the study areas. Among the total number of insects collected, some of them are insect larvae. From the different orders recorded it was observed that Order Coleoptera is the most diverse with six families and 37% of total insect population collected from the three study areas. This was followed by Order Hymenoptera with 24%, Order Hemiptera with 13% and the remaining orders viz Diptera, Dictyoptera, Orthoptera and Thysanura constitute less than 10% each of the total insect population (Fig. 2 & Table 2).

About 32 insects were collected from the Study area 1, which belongs to 6 orders with 13 families. Order Coleoptera and Hymenoptera are recognized as the dominant group comprising 5 and 3 different families respectively. A total of 13 families were recorded from site 1 and it was observed that this area is more diverse when compared to the others. Study area 2 consists of comparatively lesser diversity of soil insects than the other two areas. It includes a total of 8 different families within 5 orders. Being an open field, insects of order Orthoptera and Hemiptera were observed more . A total of 10 different families belong to 6 different orders were recorded from study area 3. It was comparatively more diverse than the faunal composition of area 1 and less than that of area 2 (Plate 2).

The diversity and abundance of Soil Insects (meso and macro) tend to vary with different habitats (Anu and Thomas, 2006). In the present study also the forest habitat (Site-1) support more abundant and diverse soil insects compared to the other two areas. The other two areas support comparatively less diversity of soil insects. This may be due to the human interference that results in disturbance of soil texture. It is well known and documented that high soil organic matter content is usually beneficial for most soil animal groups (Bandyopadhyaya *et al.* 2002). The forest ecosystem with undisturbed soil harbors high diversity and abundance of soil insects. Increased leaf litter composition and humid environment provide a much suitable condition for the rich and diverse fauna in the forests (Hazra,1982). This in turn supports the development of rich flora also. Similar results were observed in the present study in which forest habitat supports higher diversity of soil meso and macro arthropods

Indiscriminate lopping of trees, land uses, introduction of plantation of exotics, establishment of hydro electric and irrigation projects, as well as cattle grazing are some of the major disturbances to the soil ecosystems (Mujeeb Rahman 2010). Low diversity of obligate soil dwelling insects in the open field (study area 2) may be due Diversity and abundance of soil organisms decreases due to heavy population pressure to increased sand mining, cattle grazing, and other anthropogenic activities that disturbs the soil texture. The leaf litter fall was found to be very limited in this area due to lack of vegetation cover and these may be the reasons for the less diversity of soil insects in the open field habitat. Studies of MCKay and Kladvko (1985) also showed that, the greater the intensity and frequency of disturbances the lower the population density or biomass of soil fauna.

The type of soil also plays a prominent role in the diversity of faunal composition in the study areas. Humus is a mixture of tiny solid particles and soluble compounds that are too chemically complex to be used by most organisms. This mixture plays an important role in improving the physical and chemical properties of soil (Catherine *et al.*). Forest habitat with humus rich soil supports higher diversity of soil insects in this study. The diversity of soil insect fauna is intermediate in study area 3 as compared to the other two areas. This may be due to moderate vegetation type, less microhabitat and other effects of human inhabitanace in this area.

Table1: Check list of number and diversity of specimens collected from the study areas

Sub-Phylum	Class	Order	Number of Specimens
Chelicerata	Arachnida	Araneae	10
		Acari	8
Crustacea	Malacostraca	Decapoda	3
Myriapoda	Chilopoda	Lithobiomorpha	1
	Diplopoda	Spirobolida	4

Sub-Phylum	Class	Order	Number of Specimens
Hexopoda	Entognatha	Collembola	15
	Insecta	Coleoptera	25
		Diptera	2
		Dictyoptera	5
		Hemiptera	9
		Hymenoptera	16
		Insect Larvae	5
		Orthoptera	6
		Thysanura	5
Total	6	13	114

Table 2: Check list of total number and families of insects collected from the study areas

Sl. No.	Order	Families	No. of specimens
1	Coleoptera	Carabidae	2
		Curculionidae	6
		Nitidulidae	2
		Scarabidae	7
		Staphylinidae	6
		Tenebrionidae	2
2	Dictyoptera	Blattidae	5
3	Diptera	Bombyliidae	2
4	Hemiptera	Cicadidae	1
		Pyrrhocoridae	6
		Reduviidae	2
5	Hymenoptera	Chalcididae	3
		Formicidae	10
		Vespidae	3
6	Orthoptera	Acrididae	3
		Gryllidae	3
7	Thysanura	Lepismatidae	5
TOTAL		17	68

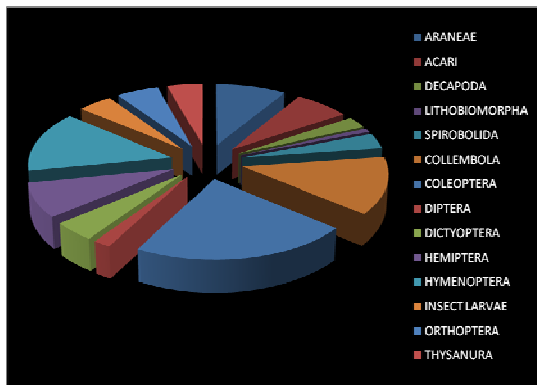


Fig. 1: Percentage of soil arthropods by class

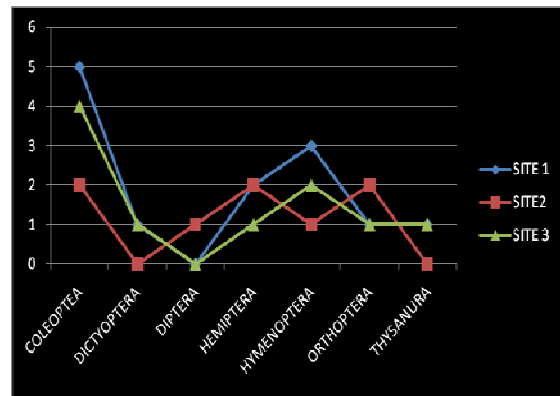


Fig. 2: Comparative diversity of soil insects

Meso and Macro Arthropods in different habitats

Order - Coleoptera



Family: *Carabidae*



Family: *Curculionidae*



Family: *Nitidulidae*



Family: *Tenebrionidae*

Order - Hemiptera



Family: *Bombyliidae*



Family: *Reduviidae*



Family: *Pyrrhocoridae*

Order - Hymenoptera



Family: *Chalcididae*



Family: *Vespidae*



Family: *Formicidae*

Order - Orthoptera



Family: *Gryllidae*



Family: *Acrididae*

Order - Thysanura



Family: *Lepismatidae*

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investigated the medicinal value of *Dahlia x hybrid* species. Antioxidant fractions were extracted from leave produced in the laboratory using different methanolic solvents by Soxhlet extractor. The total phenol content of the extract was determined by Folin-Ciocalteu method. The dried fractions were screened for their antioxidant activity potential by 1,1-diphenyl-2-picrylhydrazyl (DPPH), ferric reducing power (FRAP). The results showed that waste extract obtained from *Dahlia x hybrid* species exhibited remarkable antioxidant activity. We concluded that *Dahlia x hybrid* possibly vegetable by products have good potential as sources of polyphenols. However, more research should be carried out to identify other possible antioxidants and bioactive compounds in these resources.

Keywords: Antioxidant activity; DPPH; Medicinal value

73. DIVERSITY OF ORTHOPTERA ALONG THE CHALIYAR RIVER BASIN, KERALA

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Orthoptera is an order of insects with paurometabolous or incomplete metamorphosis including grasshoppers, crickets and locust. Orthopterans are the common component of terrestrial insect faunas and include some of the most voracious pests (locusts and certain katydids). More than 20,000 species in this order have a worldwide distribution but are most diverse in the tropics. Study area selected are Nedungayam, Vettupara and Chaliyarmukku of Chaliyar river basin. The study was conducted during the month of January 2012 to June 2012. From the study areas along the Chaliyar river banks a total of 5 families were reported. Viz. Acrididae, Pyrgomorphidae, Tettigonidae, Gryllidae and Gryllotalpidae. Two genus from the family Acrididae and single genus from the

Diversity of Odonates along the Chaliyar River Basin, Kerala

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Abstract

Odonates are most diverse group of insects usually found near water bodies and their presence indicates the overall well being of an ecosystem. A study was conducted to analyse the diversity of Odonates along the Chaliyar river basin, Kerala. The areas selected include Nedungayam, Chaliyarmukku, Vettupara and lower areas of Chaliyar river. From the study areas, a total of 23 species of Odonates were reported. Among them, 11 species were dragonflies and 12 species were damselflies. Dragonflies reported comes under a single family Lubellulidae (Skimmers), while damselflies comes under 4 families; viz. *Coenagrionidae* (Marsh darts) with 6 species, *Protoneuridae* (Bamboo tails) with 1 species, *Calopterigidae* (Glories) with 3 species and *Platycnemididae* (Bush darts) with 2 species.

Key words: Odonates, Chaliyar river, Kerala

Introduction

Dragonflies and damselflies, collectively called odonates, are one of the most common insects flying over forests, fields, meadows, ponds & rivers. Their life history is closely linked with water bodies. Odonates being predators both at larval and adult stages play a significant role in the wetland ecosystem. Adult odonates feed on mosquitoes, black flies, and other blood sucking flies and act as an important biocontrol agent. They act as scavengers of atmosphere. The larval and adult dragonflies are good indicators of a healthy ecosystem.

Kumar and Prasad (1981) made a very good input to Indian odontology by studying ecology, zoogeography, and taxonomy of odonates from Western Himalaya. Varghees and Kakkasery (1998) reported 28 species of odonates from Trissur district, Kerala. Prasad and Varshney (1995) made a check list of Indian odonata which was a comprehensive data about 499 species of dragonflies and damselflies from India. Subramanian and Sivaramakrishnan (2002) reported 176 species from Western Ghats and nearby areas, of which 67 are endemic to the region. An updated systematic list of the odonates known so far from the state of Kerala details 137 species spread over 79 genera and 31 sub families within 12 families (C. Radhakrishnan & K.G. Emiliyamma, 2003). K.G. Emiliyamma and Radhakrishnan (2002) reported 43 species of odonates from Thiruvananthapuram district and K.G. Emiliyamma (2005) reported 31 species from Kottayam district. David .V.Raju (2010) recorded 45 species from Kuttanad wetland.

Chaliyar River is the fourth largest river in Kerala, originates in the Western Ghats range at Elambalari Hills located near Cherambadi town in Nilgiri district. Chaliyar River was in the news a few years ago because of the ecological damage caused by a pulp factory at Mavoor, Kozhikode district. Odonates act as bioindicators, biocontrollers and integral part of food web. Information pertaining to biodiversity and biological attributes of insects is very important in conservation programmes. Not so much work has been done on diversity of odonates along Chaliyar River.

Materials and Methods

Odonates of the Chaliyar River were studied during December 2011 to June 2012. Best time to watch Odonates is during midday. Random method was adopted for sampling. Collections were made by hand picking or by using butterfly net. Most of the Odonates were caught, photographed and then released back to the habitat. A Digital Auto focus 10.2 Mega pixel (optical zoom 10X) and 5 Mega pixel (optical zoom 5X) cameras were used for taking high quality macro images of the entire insects and their body parts which would help in identification.

Most of the species were identified by visual counter methods. Specimens were identified with the help of standard reference field guides such as "Dragonflies of India" by K.A Subramanian. Some important features such as colour patterns of eye, mandible, labrum, wings, legs, abdomen and thorax were noted in a rough book, immediately after they were caught. Species which could not be identified in the field were identified later by experts. The colour patches on wings, venation on wings, abdomen, thorax, head, leg and the structure and shape of anal appendages were useful information for the identification for the specimen. Three sites were selected during study period as upper (Nedungayam Chaliyar mukku), middle (Vavoor Vettupara), and lower (Paruthipara) area near Chaliyar river.

Results and Discussion

A total of 23 species including 11 species of dragonflies and 12 species of damselflies were recorded from the Chaliyar River and its tributaries during the period of study. The dragonflies observed during the study belonged to a single family Libellulidae [Skimmers]. The damselflies observed during the study comes under 4 families; Coenagrionidae [Marsh darts] with 6 species, Protoneuridae [Bambootails] with 1 species, Calopterygidae [Glories] with 3 species and Platycnemididae [Bush darts] with 2 species (Fig. 1)

Table 1: Distribution of dragonflies along Chaliyar River

Sl. No	Common name	Scientific name	Family
1.	Ditch jewel	<i>Brachythemis contaminata</i>	Libellulidae
2.	Ruddy marsh skimmer	<i>Crocothemis cervilia</i>	Libellulidae
3.	Asiatic blood tail	<i>Lathrecista asiatica</i>	Libellulidae
4.	Fulvous forest skimmer	<i>Neurothemis fulvia</i>	Libellulidae
5.	Pied paddy skimmer	<i>Neurothemis tulia</i>	Libellulidae
6.	Crimson-tailed marsh hawk	<i>Orthetrum pruinosum</i>	Libellulidae
7.	Green marsh hawk	<i>Orthetrum Sabina</i>	Libellulidae
8.	Blue-tailed yellow skimmer	<i>Palpopleura sexmaculata</i>	Libellulidae
9.	Rufous marsh glider	<i>Rhodothemis rufa</i>	Libellulidae
10.	Crimson marsh glider	<i>Trithemis aurora</i>	Libellulidae
11.	Little blue marsh hawk	<i>Brachydiplax sobrina</i>	Libellulidae

Table 2: Distribution of damselflies along Chaliyar river

Sl. No	Common name	Scientific name	Family
1.	Pigmy dartlet	<i>Agriocnemis pygmaea</i>	Coenagrionidae
2.	Orange-tailed marsh dart	<i>Ceriagrion cerinorubellum</i>	Coenagrionidae
3.	Orange marsh dart	<i>Ceriagrion rubiae</i>	Coenagrionidae
4.	Golden dartlet	<i>Ischnura aurora</i>	Coenagrionidae
5.	Blue grass dartlet	<i>Pseudagrion microcephalum</i>	Coenagrionidae
6.	Saffron-faced blue dart	<i>Pseudagrion rubriceps</i>	Coenagrionidae
7.	Yellow bush dart	<i>Copera marginipes</i>	Platycnemididae
8.	Blue bush dart	<i>Copera vittata</i>	Platycnemididae
9.	Black bamboo tail	<i>Prodasineura verticalis</i>	Protoneuridae
10.	Stream glory	<i>Neurobasis chinensis</i>	Caloptergidae
11.	Clear-winged forest glory	<i>Vestalis gracilis</i>	Caloptergidae
12.	River heliodor	<i>Libellago lineate</i>	Caloptergidae



A. *Lathrecista asiatica* (male), B. *Neurothemis tulia* (female), C. *Rhodothemis rufa* (male)



A. *Palpopleura sexmaculata* (female), B. *Rhodothemis rufa* (female), C. *Neurothemis fulvia* (male)



A. *Brachythemis contaminata*, B. *Crocothemis servilia*, C. *Trithemis aurora*



A. *Orthetrum sabina*, B. *Neurothemis tulia*, C. *Orthetrum pruinosum*



A. *Ischnura aurora*, B. *Ceriagrion rubiae*, C. *Ceriagrion cerinorubellum*



A. *Pseudagrion microcephalum*, B. *Pseudagrion rubriceps*, C. *Prodasineura verticalis*



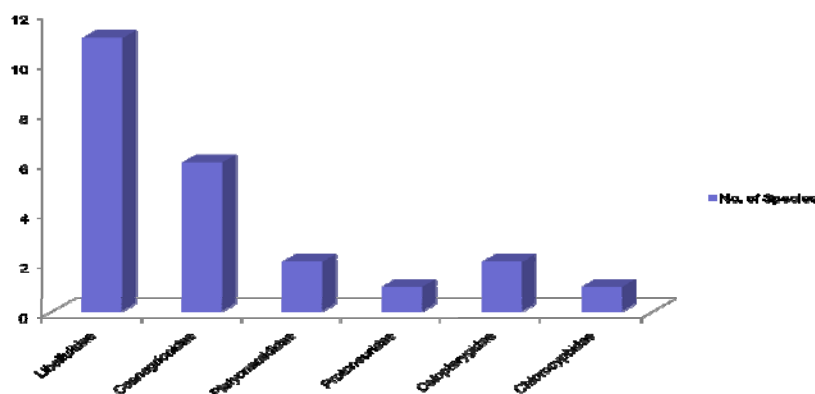
A. *Libellago lineata*, B. *Neurobasis chinensis*, C. *Agriocnemis pygmaea*

The dragonflies observed during the study period come under the family Libellulidae. It is most diverse group of dragonflies and breeds in a variety of aquatic habitats like puddles, ponds, marshes, rivers, domestic storage tank and aquaria. Out of the 11 species observed *Brachythemis contaminata* is a dragonfly of polluted water. Of the many visits *Neurothemis fulvia* and *Diplocodes trivialis* was observed only during the first visit[December]. *Neurothemis tulia* and *Orthetrum Sabina* and *Orthetrum pruinosum* were observed during all visits[December-june]. Their flight season is throughout the year. *Trithemis aurora* was observed during all visits except first visit.

Neurothemis tulia is a conspicuous species of ponds, marshes and paddy fields. Their flight is slow and weak. It was observed in stagnant waters during the study. *Orthetrum pruinosum* is a very common dragonfly of wells, ponds, ditches, tanks and rivers. It was the only dragonfly observed in lower region of Chaliyar tributaries near Paruthippara.

During last two visits, *Vestalis apicalis* and *Vestalis gracilis* cannot be reported from all three sites. It was observed during the February-march months. They were not reported from vettupara during the study period. Orthetrum and Tulia species were most notable dragonfly along Nedungayam region during all the visits of study period. The presence of glories, clubtails, torrent darts, reed tails and Bambootails are good indicators of riverine system (Subramanian, 2005). Two species of glories [*Neurobasis chinensis*, *Vestalis gracilis*] were observed from Nedungayam. Thus it indicates that it is less polluted than Vettupara area. 12 species of damselflies were observed during the study. In the present study, more species were observed from Chaliyar mukku and Nedungayam. During some season, more number of species were observed from Vettupara region. Clearing up of the forest areas, filling up of low land, particularly of water bodies in the name of development and polluting water bodies lead to the elimination of these insects. After proper analysis it has to be determined whether these areas need any conservation.

Fig. 1: Family wise Distribution of Odonates along Chaliyar River Basin



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DIVERSITY OF FISH FAUNA IN BHARATHAPUZHA, KERALA

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INTRODUCTION

Kerala is a land of rivers which harbour a rich and diversified fish fauna characterized by many rare and endemic species. Bharathappuzha (Nila) is the second-longest river in Kerala. A view over Bharathappuzha, near shoranur seems to be that it is extensively dammed. There are 11 reservoirs along the course of the river, and two more are under construction. Most of these reservoirs serve the purpose of irrigation only. Notable studies on the freshwater fish fauna of Kerala are those of Day (1865, 1878, 1889); Pillai (1929); John (1936); Hora and Law (1941); Silas (1951a, 1951b); Kurup and Samuel(1985); Rama Devi and Indra (1986); Pethiyagoda and Kottelat (1994); Easa and Shaji (1995); Menon and Jacob (1996); Manimekalan and Das (1998); Ajithkumar et al (1999); Raju et al. (1999a and b) and Biju, Thomas and Ajithkumar (1999).

The identification of 175 freshwater fishes from 41 west flowing and 3 east flowing river systems of Kerala was confirmed. These can be grouped under 106 ornamental and 67 food fishes. The biodiversity status of these fishes was assessed according to IUCN criteria. The results showed that populations of the majority of fish species showed drastic reduction over the past five decades. Thirty-three fish species were found to be endemic to the rivers of Kerala. The distributions of the species were found to vary within and between the river systems and some of the species exhibited a high degree of habitat specificity. The diversity and abundance of the species generally showed an inverse relationship with altitude. The serious threats faced by the freshwater fishes of Kerala are mostly in the form of human interventions and habitat alterations and lack of conservation plans for the protection and preservation of the unique and rare fish biodiversity of Kerala are also highlighted.

India ranks eighth among the major fish producing countries of the world. In recent years the demand for fish as a protein source has increased enormously. To meet this demand there has been increasing fishing pressure on the wild fish stocks. Pisci-culture is becoming an important activity to enhance fish production yet there is a considerable decline in the abundance of fish stocks. This might be due to the heavy mortality caused by a variety of disease conditions and anthropogenic interventions deteriorated the health of the ecosystem. The interventions already resulted in the faunal change and decline of population or even the extinction of the species. The study was intended to identify the fish fauna of Nila river and to estimate its abundance. It also tried to find out the environmental issues that lead to decline of fish fauna.

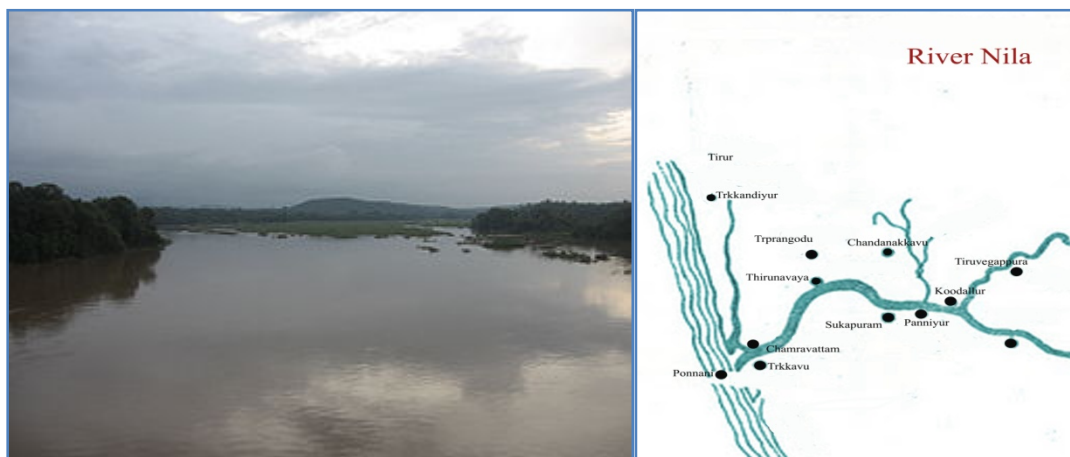
MATERIALS AND METHODS

Bharathappuzha passes through the district of Coimbatore, Palakkad, Malappuram and Thrissur. The river has a length of 204 km and it reaches the Arabian Sea at Ponnani. Its main tributary, thoothappuzha originates from the Silent Valley, flows through Thootha Elamkulam, Pulamanthole and joins the main river at Pallippuram. After a course in Palakkad and Trissur district the Bharathappuzha again enters and Malappuram district at Thiruvegappura and from Kuttippuram onwards. The river belongs entirely to Malappuram.

The fishes were collected during the months of January 2013-June 2013. Fishes were collected personally and also with the help of fisherman using indigenous fishing methods (it is the traditional method of fishing. Here fishes are collected using cast net.) Some are purchased from the fisherman from the site and also from fish collection centers. After collection, the fishes were preserved in 10% formalin. Smaller specimens are put in formalin solution. While medium sized ones, prior to the fixation may be given longitudinal incision along the abdomen, without injuring the alimentary canal. Large forms are injected with 10% formalin into the muscles and abdomen.

The collected fishes were identified from the Department of Aquaculture and Fisheries, M.E.S. Ponnani and some species were identified by Mr. Shaji. Standard manuals and other published information (Day, 1865, 1878, 1889, 1952, 1969, 1976; Talwar and Jhingran, 1991) were also used for identification. After identification fishes were kept in plastic jars containing 10% formalin and the jars were properly labeled. The fish fauna were classified up to species level as per the key of Day (1878), Talwar and Jhingran (1991), Jayaram (1999). Abundance of each species were found out during each month (January, February, March, April, May, June 2013). Some fishes were found in very rare (+)# while some others are rare (++)#e. they found in medium number and yet others were found in large numbers (+++)#

STUDY AREA



RESULTS AND DISCUSSION

A total of 18 species belonging to 8 orders (Perciformes, Siluriformes, Cypriniformes, Channiformes, Anguiliformes, Synbranchiformes, Clupeiformes and Mugiliformes) and in 13 families (Cichlidae, Nandidae, Anabantidae, Gobiidae, Ambassidae, Bagridae, Heteropneustidae, Siluridae, Cyprinidae, Anguilidae, Mastacembelidae, Engraulidae and Mugilidae) were recorded from Bharathappuzha. Cichlidae and cyprinidae has the highest representation. The family nandidae, anabantidae, bagaridae, heteropneustidae, Sciluridae, channidae, and anguillidae, Gobiidae, Ambassidae, Mastacembelidae, Eugraulidae, and Mugilidae each were represented by single species.

Twenty three fish species were reported from Bharathapuzha by Prameela (2008) in the previous study. In the present study *Ompok*, *Stolephorus*, *Anguilla* and *Macrognathus* species were collected, which were not observed during the previous study. But in the previous study other species like *Rasbora*, *Euryglossa*, *Mystus*, *Mastacembelus* and *Platycephalus* etc. were reported, which were not collected in the present study.

TABLE - 1

Fish species collected from Nila river during January - June 2013

Serial no:	Order	Family	Scientific name
1	Perciformes	Cichlidae	<i>Etroplus suratensis</i>
2	Perciformes	Cichlidae	<i>Etroplus maculatus</i>
3	Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>
4	Perciformes	Nandidae	<i>Nandus nandus</i>
5	Perciformes	Anabantidae	<i>Anabus testudineus</i>
6	Perciformes	Gobiidae	<i>Glossogobius giuris</i>
7	Perciformes	Ambassidae	<i>Ambassis dayi</i>
8	Siluriformes	Bagridae	<i>Horabagrus brachysoma</i>
9	Siluriformes	Heteropneustidae	<i>Heteropneuster fossilis</i>
10	Siluriformes	Siluridae	<i>Ompok bimaculatus</i>
11	Cypriniformes	Cyprinidae	<i>Downkinsia filamentosa</i>
12	Cypriniformes	Cyprinidae	<i>Garra mullya</i>
13	Cypriniformes	Cyprinidae	<i>Hypselobarbus curmuca</i>
14	Channiformis	Channidae	<i>Channa striata</i>
15	Anguilliformes	Anguillidae	<i>Anguilla bicolor</i>
16	Synbranchiformes	Mastacembelidae	<i>Macrogathus guntheri</i>
17	Clupeiformes	Engraulidae	<i>Stolephorus sp</i>
18	Mugiliformes	Mugilidae	<i>Mugil cephalus</i>

There are a lot of variations in the abundance and species of fishes. Some species are more abundant in that time and also some are rare. *The Mastacembelus* species and *Puntius* species are most abundant during the previous study. But in the present study *Anabus* species and *Channa striata* are the most abundant species. The fishes fauna of entire study area comprises, fishes like *Puntius* (*Downkinsia*), and *Etroplus* in all season. These variations may be due to some factors such as seasonal variations.

Today the fish production is under the decline. This might be due to the heavy mortality caused by variety of diseased conditions and anthropogenic interventions that deteriorated the health of the ecosystem. The declines in the abundance of fish fauna may be due to some factor such as climatic change, global warming, and pollution include environmental pollution, river pollution, domestic pollution and the pesticide pollution.

The other important factor is sand mining that widely occurring in Nila River. Sand mining is responsible for considerable environmental change in water quality. This may adversely effect the reproduction of the fishes, which decline the population of fishes. There are some species which are endangered and critically threatened. Even though in this critical condition Nila River is not properly protected to conserve the fish fauna.



1. *Etropus suratensis*



2. *Etropus maculatus*



3. *Oreochromis mossambicus*



4. *Nandus nandus*



5. *Anabus testudineus*



6. *Glossogobius giuris*



7. *Ambassis dayi*



8. *Horabagrus brachysoma*



9. *Heteropneustes fossilis*



10. *Ompok bimaculatus*



11. *Downkisia filamentosa*



12. *Garra mullya*



13. *Hypselobarbus curmuca*



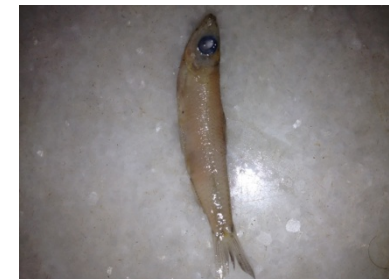
14. *Channa striata*



15. *Anguilla bicolor*



16. *Macrogathus guntheri*



17. *Stolephorus sp*



18. *Mugil cephalus*

Table: 2 - Abundance of fishes in Bharathappuzha

Serial no:	Species	Abundance
1	<i>Etroplus suratensis</i>	+++
2	<i>Etroplus maculatus</i>	+++
3	<i>Oreochromis mossambicus</i>	++
4	<i>Nandus nandus</i>	++
5	<i>Anabus testudineus</i>	+++
6	<i>Glossogobius giuris</i>	+++
7	<i>Ambassis dayi</i>	++
8	<i>Horabagrus brachysoma</i>	+++
9	<i>Heteropneuster fossilis</i>	++
10	<i>Ompok bimaculatus</i>	+
11	<i>Downkinsia filamentosa</i>	+++
12	<i>Garra mullya</i>	++
13	<i>Hypselobarbus curmuca</i>	++
14	<i>Channa striata</i>	+++
15	<i>Anguilla bicolor</i>	++
16	<i>Macragnathus guntheri</i>	++
17	<i>Stolephorus sp</i>	++
18	<i>Mugil cephalus</i>	+++
	+ = Less abundant (below 8) ++ = More abundant (8-40) +++ = Most abundant (Above 40)	

Table: 3 - Abundance of fish species during January - June 2013

SI No:	Species	Jan	Feb	Mar	Apr	May	Jun	Total
1	<i>Etroplus suratensis</i>	8	12	24	5	6	15	70
2	<i>Etroplus maculatus</i>	7	10	4	14	6	9	50
3	<i>Oreochromis mossambicus</i>	8	5				9	22
4	<i>Nandus nandus</i>	2	8	1		5	2	18
5	<i>Anabus testudineus</i>	16	4		8	24	6	58
6	<i>Glossogobius giuris</i>	4	6	5		8	13	36
7	<i>Ambassis dayi</i>	3		7	2	1	5	18
8	<i>Horabagrus brachysoma</i>	9	15	12	4		11	51
9	<i>Heteropneuster fossilis</i>	8	9	3	4	1	5	30
10	<i>Ompok bimaculatus</i>			1				1
11	<i>Downkinsia filamentosa</i>	14	11	6	10	9	28	78

12	<i>Garra mullya</i>	8	2	12	7	10		39
13	<i>Hypselobarbus curmuca</i>	4	8	7				19
14	<i>Channa striata</i>	18	10	9	11	8	21	77
15	<i>Anguilla bicolor</i>	3	4	1				8
16	<i>Macrogathus guntheri</i>	10	3				9	22
17	<i>Stolephorus sp</i>	11	8	6	2	2		29
18	<i>Mugil cephalus</i>	8	12	6	9		10	46

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THE STUDY ON DIVERSITY OF ANTS ALONG THE BANKS OF CHALIYAR RIVER AND ITS MAJOR TRIBUTARIES

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Ants are the most abundant, highly specialized, polymorphic, eusocial group of insect belonging to family Formicidae, order Hymenoptera. The study sites were chosen on the basis of difference in floral diversity. The present study was carried out in "Banks of Chaliyar river and its major tributaries", Higher region- Nedumkayam and Chaliyar mukku, Middle region- Vavoor and Vettupara, Lower region- Feroke, from November 2011- June 2012 to explore the diversity of ants. Totally 50 species of ants belonging to 22 genera, under 5 subfamilies were collected during the study period, in which 28 species were recorded in higher region, 23 species in middle region and 13 species from lower region. The study states that most prominently represented subfamily is Myrmicinae and the most widely distributed genus is *Camponotus*. The most abundant species is *Anoplolepis gracilipes*. The study reveals that more species of ants are recorded from higher region- Nedumkayam, because of the rich vegetation and different biotic and non-biotic factors. This study also compares the ant fauna in teak plantation and in riverine area. This reveals that some species are unique to those areas.

Key words: Ants, species diversity, species abundance, Chaliyar river