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Effect of Sub Lethal Concentration of Coragen and 2,4-D Ethyl Ester on Biomass and Reproductive Parameters of Earthworm Species, *Eudrilus eugeniae* Kinberg, 1867.

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ABSTRACT: Present study revealed with chronic effect of sub lethal concentrations of two commonly used pesticides like Coragen (insecticide) and 2,4-D Ethyl ester (herbicide) on biomass and reproductive parameters on earthworm species, *Eudrilus eugeniae*. The results showed there was significantly decrease in biomass of treated worm than control group. Similar results find in cocoon production as well as juvenile count in treated worms. Maximum reduction in all parameters were found to be occur in worms treated with higher (3/4th) sub lethal dose concentration than the lower (1/4th) dose concentration i.e. toxicity is dose dependent. The results of present study can be used to plan and implement remediation strategies for the pesticide polluted soils where risk of soil pesticide contamination is associated with population of soil invertebrates.

KEY WORDS: Chronic, Coragen, herbicide, juvenile, cocoon, biomass, toxicity.

I. INTRODUCTION

Today's agriculture practices are pesticidal based. To get maximum yield, tons of synthetic pesticides and chemical fertilizers are applied annually to crops worldwide to eliminate unwanted weeds, fungus and insect pests etc. The use of pesticides has increased with the increasing awareness of their utility in agriculture, animal husbandry and post harvest technology as well as public health [1]. In our country, agriculture is major backbone of economy but unfortunately it is depends on chemical fertilizers and pesticides. India is the largest manufacturer of pesticides; around 128 pesticides are registered in India [2]. Pesticides which includes insecticides, molluscicides, bacteriocides, fungicides, weedicides and nematicides [3].

A great proportion of biomass of terrestrial invertebrates is represented by earthworms, as it plays an important role in increasing the nutrient content of the soil and plays the vital role in the maintenance of soil structure, functions and fertility [4]. Earthworm activity not only modifies soil aeration and drainage but also provides essential nutrients for plant growth. They are the key components of soil biota and contribute to the overall productivity of agricultural soil through their feeding, casting and burrowing activities [4, 5]. The population of earthworms is greatly affected by excess usage of inorganic fertilizers and pesticides especially they affect reproductive potential of earthworms and causes decline the population of the worms. Pesticides are also known to produce morphological, anatomical and physiological changes in the reproductive aspects of different non-target animals including earthworm [6].





The earthworm species, *Eudrilus eugeniae* is commonly called African night crawler, which is used extensively for composting in tropics especially in Africa and India. This species is more productive in terms of rates of growth than other earthworm species. Effect of pesticides on growth of reproductive parameters of earthworms exposed to agro pesticides loaded soils seems to be useful indicator of soil pollution [7].

Coragen (Chlorantraniliprole) is a novel substituted antranilamide insecticide. The commercially available Coragen has 18.5% EC concentration. It is recommended for controlling pests of rice, cabbage, cotton and sugarcane. Similarly, 2, 4-D ethyl ester is a good wide spectrum weedicide. In market it is available in the concentration of 38% EC and used for the control of broad leaf weeds.

The present study is undertaken to determine the effect of Coragen (insecticide) and 2, 4-D Ethyl ester (herbicides) on biomass and reproductive parameters of earthworm species *Eudrilus eugeniae*.

II. MATERIALS AND METHODS

Biological Material: Earthworm species, *Eudrilus eugeniae* were obtained from State Government agricultural nursery, Sakri (Dhule) M. S. They were maintained in the laboratory as per OECD guideline [8]. Only healthy adult worms having well developed clitella were used for the experiment.

Chemical Material: Two chemicals i.e. commercially available Coragen (18.5 % EC) an insecticide and wide spectrum herbicide, 2, 4-D ethyl ester (38. % EC) commonly were purchased from local pesticide shop. The quality soil and a month old cow dung were collected from agriculture field and cow shed respectively.

Experimental Set-Up: The experiment was performed in plastic tough having five kg capacities. A dried quality soil was ground and sieved. In a tough 800 g of fine soil thoroughly mixed with 200 g Cow dung (CD) and appropriate amount of water was added to moisten the mixture.

Treatment: For sub lethal dose, the LC_{50} values of the both the pesticides in earthworm were already estimate in our previous study, it was 17.9ml/kg for Coragen and 0.350 ml/kg for 2, 4 - D ethyl ester. The lower (1/4th) and higher (3/4th) sub lethal dose concentration are 4.48 and 13.42 ml/kg respectively for Coragen and 0.088 and 0.260 ml/kg respectively for 2,4-D ethyl ester was added separately in 100 ml of distilled water and that was mixed thoroughly in experimental groups only. On next day 20 mature worms were added to each tough. The tough was covered with perforated lid and kept for 60 day. The experiment set up was prepared in triplicate for each treatment.

At the end of experiment earthworms were separated by hand sorting washed with water and kept on filter paper. Weigh the worms to calculate the growth of biomass. Similarly the number of cocoons and juveniles are also hand sorted, counted and tabulated, the data was statistically analyzed.

The per cent change in biomass, number of cocoon and juvenile were determined by applying following formula i.e.

$$\% \text{ change} = \frac{\text{Control} - \text{Experimental}}{\text{Control}} \times 100$$

III. RESULTS AND DISCUSSION

The result on biomass and reproductive parameters of earthworm treated with pesticides is presented in table-1. From this table we find following results;

On growth of biomass:- At the end of experiment significant increase in biomass is observed in all groups. Maximum (46.1 %) increase was finding in control group, while dose dependent but significant increases were recorded in Coragen (i.e. 32.5 % and 28.95 %) and in 2-4-D ethyl ester (i.e. 39.0 % and 34.30 %) in the worms treated with 1/4th and 3/4th sub lethal concentration respectively.

Our result are corroborated with the results of earlier workers like Spurgeon et al (2004) in earthworm exposed to pesticides and heavy metal like Copper and Cadmium may experience physiological disturbances such as reduction in biomass, population size and reproduction as well as lysosome deficiencies. Capowitz [9] and Olvera-Velora [10] reported that there are high losses in body mass of earthworm treated with insecticides like imidaclopride and ethyl parathion may lead to negative effects on reproduction and their survival. Ahmed [11] showed that the loss of body





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weight along with behavioral changes like coiling, swollen body, sluggish movement and discharge of coelomic fluid was observed in earthworm species, *Lumbricus terrestris* when exposed to pesticides viz., Cyren, Ridomil and Triphen for 4 weeks. Hundal [7] revealed that the higher dose of insecticide like Chloropyrifos were found to be detrimental to the growth and reproductive performance in the earthworm compare to low and recommended doses over the control group.

On cocoon and juvenile Production:- There was significant decrease in cocoon production and number of juveniles count in worm treated with pesticides over the control. Maximum reduction was found in the worms treated with higher sub lethal ($3/4^{\text{th}}$) concentration i.e. for cocoon count it was 21.4 % and 28.6 % respectively in 2,4-D ethyl ester and Coragen treated and for juvenile count, it was 33.3 % and 48.4 % respectively as compare to control. Our finding is similar with earlier workers like [12] stated that contaminated dose samples have delayed cocoon production and it has been suggested that cocoon production rates were particularly sensitive during early period of reproduction. Gupta and Sexena [13], find higher sub lethal concentration of pesticides influence the reproductive parameters i. e. cocoon production and maximum number of hatching per cocoons and longer incubation periods of worms in a dose dependent manner. Espinoza and Bustos [14] studied numerous reproductive parameters in earthworms exposed to various insecticides and chemicals like cocoon production, cocoon hatching and sperm production, ability of the worm produced, sexual maturation and genotoxicity etc. Yasmin and D'Sauza [15], reported that the cocoon production was found to be most sensitive parameter for pesticide treatment on worm. Rai and Bansihal [16] reported exposure of worms to higher sub lethal dose of malathion produced lesser number of cocoons and hatching than the worms exposed to lower sublethal concentration. Zarea [17] revealed earthworms affected by herbicide in general show low toxicity towards earthworms than insecticide and Hundal [7] revealed when *Eudrilus eugeniae* exposed to chloropyrifos insecticide which impairs the cocoon production and number of hatching.

Amorium [18] tested earthworms with herbicides and found reproduction is the more sensitive end point than portality in *Enchytraeus albidus* and *Enchytraeus luxuriosus*. Frampton [19] stated that acute mortality test would not provide the most sensitive risk estimate for earthworms in majority of cases. Similarly, Rombke [20] suggested that sub lethal effect is more sensitive and more realistic approach for the prediction of environmental effects, because applied concentration of pesticides in the field are usually quite low.

IV. CONCLUSION

The earthworm is the major soil fauna to be exposed to soil contaminants and their presence is an bio indicator of soil health. In present investigation, potential negative impact of insecticide and herbicide on non target organism or beneficial species. Herbicide in general show low toxicity towards earthworms' species, *Eudrilus eugeniae*. Results of the present study provide evidence that sub lethal doses of pesticide affect on growth, cocoon production and numbers of juveniles. Result of the present study can be used to plan and implement remediation strategies for the pesticide polluted soils where risk of soil pesticide contamination is associated with population of soil invertebrates.

V. ACKNOWLEDGMENTS

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Pesticides	Vermibed Groups	Weight of worms (g)		% increase	Number of	
		Initial	Final		Cocoon	Juveniles
	Control	14 ± 1.0	26 ± 1.5	46.10	14 ± 1.0	62 ± 3
2,4-D Ethyl ester	Expt. I (1/4 th)	12.5 ± 1.0	20.5 ± 1.2	39.0	13 ± 1.0 (7.1) NS	50 ± 2.0 (19.3) *
	Expt. II (3/4 th)	13.8 ± 1.2	21 ± 1.0	34.30	11 ± 1.0 (21.4) *	41 ± 2.0 (33.3) **
Coragen	Expt. I (1/4 th)	13.5 ± 1.0	20.0 ± 1.0	32.5	12 ± 1.0 (14.3) NS	39 ± 1.0 (37.1) **
	Expt. II (3/4 th)	13.5 ± 1.2	19 ± 0.4	28.95	10 ± 1.0 (28.6) *	32 ± 2.0 (48.4) **

Table -1
Biomass and reproductive parameter (cocoon and Juvenile) count of earthworm.
 Per cent values are % change over control. CD (Mean ± SEM, n = 3)

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Effect of Sub Lethal Doses of Coragen and 2,
4-D ethyl Ester on Digestive Enzymes of
Earthworm Species *Eudrilus eugeniae*,
Kienberg 1867

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ABSTRACT : Present piece of research work deals with studies on effect of sub lethal concentration of pesticides like Coragen (insecticide) and 2, 4-D ethyl ester (herbicide) on digestive enzymes of earthworm, *Eudrilus eugeniae*. The digestive enzymes of worm are responsible for quick decomposition and humification of organic matter. Our results revealed that the activity of enzymes is significantly declined over the control. The activities of protease, amylase and phosphatase were found to be - 53.86 and - 43.33; - 30.55 and - 61.97, and - 39.40 and -32.00 per cent in the worms exposed to Coragen and 2, 4-D ethyl ester respectively. They also delayed in the process of decomposition and digestion.

KEYWORDS: Pesticides, insecticides, herbicides, Coragen, decomposition, humification.

I. INTRODUCTION

To support alarming population growth throughout the globe there is necessity of more food result in rapid growth of pesticides [1,2]. In modern agricultural practices to enhance productivity there is a need to protect the crop from attack of insect pest. Farmers are applying different kinds of insecticides to get rid of pests. They use pesticides for precise purpose to eliminate weeds, kill harmful fungi and eradicate insect pest; all of which can damage crops. In spite of their benefits, increasing trends of pesticides application has deleterious effect on human and ecosystem especially on non target organisms and these chemicals persist several years in the environment [1]. Earthworm effectively harness the beneficial soil microflora, destroy soil pathogens and convert organic waste into enzymes, antibiotics, growth hormones and protein rich cast [4,5] but most of pesticides especially herbicides adversely affect on beneficial organism like birds, mammal etc [6,7]. It is able to alter community dynamics [8]. Earthworm itself acts as a house which supply of enzymes such as amylase, cellulase, nitrate reductase and alkaline phosphatase. The digestive enzymes of earthworm are responsible for the decomposition and humification of organic matter. The compost thus forms as high as economic value of soil condition for plant growth [9,10]. Coragen (Chlorantraniliprole), a recently introduced diamide insecticide. It is recommended particularly for controlling pest of rice, cabbage, cotton and sugarcane etc which have developed resistance to other chemical classes of insecticides. It has high biological activity, very low mammalian toxicity and selectivity to non-target arthropods [11]. Similarly a commercially available herbicide (2,4-D ethyl ester) is a good wide spectrum weedicide, recommended for the control of broad leaf weeds. These two pesticide effects have not been reported so far in earthworm. Therefore the attempt has made to study the effects of sub lethal dose of Coragen (insecticide) and 2,4 D ethyl ester (herbicide) on digestive enzymes of earthworm *Eudrilus eugeniae*.

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II. MATERIAL AND METHOD

BIOLOGICAL MATERIAL: Earthworm species *Eudrilus eugeniae* were obtained from government of Maharashtra agricultural nursery, Sakri, Dist - Dhule. They were maintained in the laboratory [12]. Healthy adult clitellar worms were selected for the present experiment.

CHEMICAL MATERIAL: A commercially available Coragen, 18.5% EC is a novel substituted anthranilamide insecticide. Another pesticide, 2,4-D ethyl ester, 38% EC is a good wide spectrum weedicide. Both are purchased from local market.

The quality soil and a month old cow dung were collected from agriculture field and cow shed respectively.

EXPERIMENTAL SET-UP : In plastic tough of about 5 kg capacity, 800 g fine dried soil along with 200 g dried cow dung was used for this experiment. The mixture was thoroughly mixed with water and kept ready for experiment. The LC₅₀ value of an insecticide, Coragen and 2, 4 D ethyl ester was previously find out in our study. For Coragen it was 18 and 17 ml/kg for 7 and 14 days of exposure respectively. While 2, 4-D ethyl ester was 0.43 and 0.34 ml/kg for 7 and 14 days respectively. A higher sub lethal (3/4th of LC₅₀) dose i.e. 13.42 ml/kg of Coragen and 0.255 ml/kg of 2,4-D was selected for this study. A higher sub lethal dose of both the pesticides was added in 100 ml of water and it was mixed in the respective treatment groups only. 20 mature clitellar worms were released in each tough; they were covered with perforated lid. To maintain moisture water was sprinkled at the interval of 3 to 4 days. The entire tough was kept for 60 days at room temperature 26 ± 2 °C and moisture 70 ± 5 %. The experimental set-up was prepared in quadruplets for each treatment. A single bed was kept as a control without pesticides.

ENZYMATIC MEASUREMET: At the end of the experiment, to clear the digestive tract the earthworms were fasted for 24 h. Prior to biochemical analysis, the worms were cut into pieces and mixed with ice cold saline solution (0.86% Na Cl). The mixture was homogenized and centrifuged for 10 minute at 3000 rpm; the supernatant was used for determination of enzyme activities. The activities of enzyme like amylase, protease and acid phosphatase were determined by [13,14,15] respectively

III. RESULT AND DISCUSSION

Activity of the digestive enzymes protease, amylase and acid phosphotase of treated earthworm with 3/4th sub lethal dose of Coragen and 2, 4 D ethyl ester were presented in table-1. Our results revealed that the production of enzymes was significantly reduced over the control. The activity of protease (-53.86 %) and acid phosphotase (-39.40 %) was comparatively reduced in worm treated with insecticide than herbicide while the amylase activity (-61.96 %) was highly reduced in herbicide than insecticide.

Activity of amylase, cellulase, chitinase, lichenase, protease, lipase, urease, acid and alkaline phosphatase etc have been recorded in the gut of earthworm species like *Dichogaster bolawi*, *Dravida calebi*, *Dravida wilsii*, *Entyphoocus spp.*, *Perionyx millardi* and *Pontoscolex corethrus* [16,17].

[18] found that feeding *Spodoptera littoralis* larvae with 5 ppm abamectin caused remarkable decrease in invertase, amylase and trehalase activities.

[19] reported ageing effect on enzyme activities in pressmud vermicasts of *Lampito mauritii* (Kinberg) and *Eudrilus eugeniae* (Kinberg).

[20] studied the level of various digestive enzymes like amylase, cellulose, xylanase, cellbiase, endonuclease and their activities in the gut of the two earthworms, *Eudirlus eugeniae* and *Eisenia fetida*. They reported overall enzymatic activity.

[21] reported reduction in the cellulose activity in the gut of earthworms treated with deltametrine pesticide and found inhibiting earthworm growth after 42 days of exposure.

[22] studied that the methanolic extract of *Artemisia annua* L. was investigated for its toxic effect on biochemical parameters of leaf beetle, *Xanthogaleruca luteola*, Mull. They reported within 24 h after treating 3rd instar larva with the extract, the level of alpha amylase was significantly changes.

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Treatment of rynaxypyr and spinetoram (radiant) shown significant decrease in the activities of trehalose, invertase and amylase [23].

[24] studied effect of herbicides like Dhanutop and Racer on digestive enzymes of epigeic earthworm, *Perilomyx excavatus*. They showed that decrease in digestive enzyme activity in sub lethal doses as increasing days of exposure. It is because of the herbicides is persisting in the food that prevents consumption of food by the worms. Our results are corroborated with earlier workers.

Table-1: Digestive enzymes activity of Earthworm exposed pesticides

Sr. No.	Pesticides	Sub lethal dose ^c (mg/ kg of soil)	Enzymes activities					
			Protease (µg/ min)		Amylase (Units/ ml)		Phosphotase (µ/ L)	
			Control	Experimental	Control	Experimental	Control	Experimental
01	Coragen	13.42	5.80 ± 0.6	2.40 ± 0.4 (-53.86)**	720 ± 8.0	500 ± 10.0 (-30.55)*	0.40 ± 0.02	0.24 ± 0.02 (-39.40)**
02	2,4-D ethyl ester	0.255	6.0 ± 0.6	3.4 ± 0.4 (-43.33)**	710 ± 10.0	270 ± 8.0 (-61.96)***	0.40 ± 0.04	0.32 ± 0.02 (-32.00)*

* Significant value: P<0.05, ** P<0.01, *** P<0.001. Values in the parenthesis are per cent change over control. CD (Mean ± SEM, n = 4).

IV. CONCLUSION

In nutshell we conclude that;

1. Both insecticide i.e. Coragen and 2, 4-D ethyl ester were toxic to earthworm under chronic exposure.
2. These results suggest that changes in enzyme activity during sub lethal exposure periods may be more sensitive parameter than LC₅₀ Since they provide early warning responses at sub lethal doses.
3. Decrease in the enzyme activity represents the stress in organisms and disturbance in biochemical metabolisms.

V. ACKNOWLEDGMENTS

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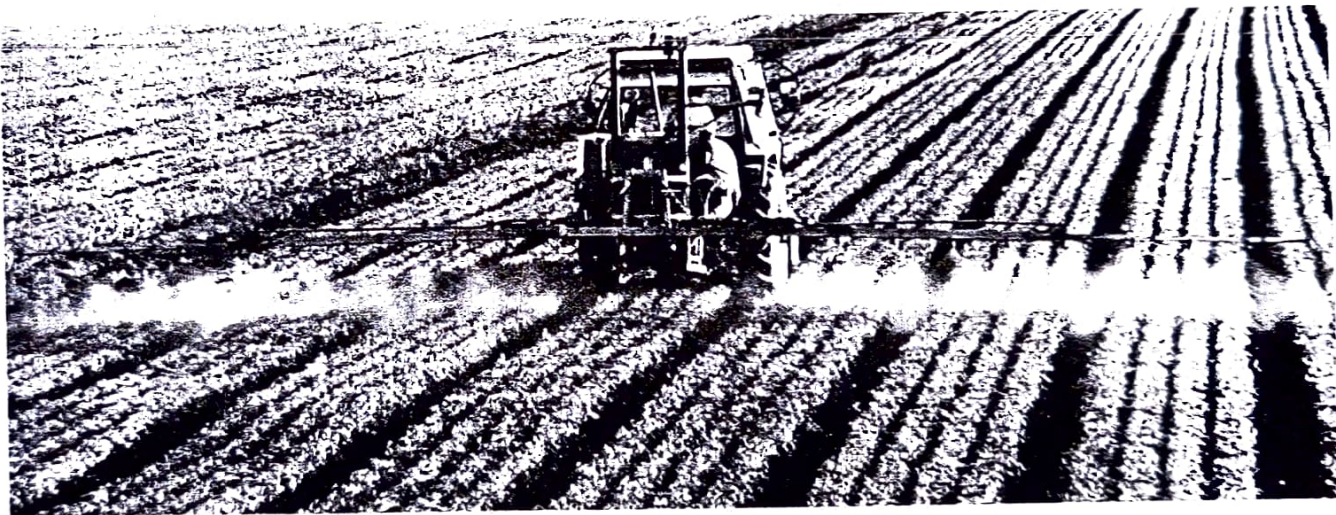
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ETHNOBOTANICAL USES OF PLANTS FOR DENTAL CARE FROM FOREST AREA OF NAVAPUR TALUKA, NANDURBAR DISTRICT (MS).

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Abstract

The flora of this region is highly diversified in vegetation and contains considerable number of economically important species. The communities of tribal are poor and unable to afford the expenses of modern medicinal treatment. They have the indigenous knowledge of medicinal plants, therefore they depend on the traditional medicines. They use various plant parts or entire plant for dental care. The present study deals with medicinally important plants for the dental care.

Key words: Ethno botanical, Dental care, Forest, Navapur, Nandurbar District.

Introduction

Navapur is one of the six taluka of Nandurbar. It is located between $21^{\circ}09'$ - $21^{\circ}15'$ latitude $73^{\circ}48'$ - $73^{\circ}80'$ longitude of Nandurbar District. It is very pleasant place surrounded by hills of dense forest of North Western Ghat from one side. The forest is intermixed with hamlets and villages. Forest of this area is mainly dry deciduous type. The tribal and certain local communities of this region are poor and unable to afford the expenses of modern medical treatment therefore they depend on traditional medicines. They practice herbal medicines to cure various diseases and disorders. They collect and preserve locally available wild and cultivated plant species. The objective of the study was to assess the richness of ethno-medicinal plant species used by tribal of forest area of Navapur taluka and the traditional medical practice of the people. The authors tapped the first hand ethno medicinal information from Bhagat, Buwas (Witch Doctors), Medicine men (Vaidu), Mukhiya and tribal old peoples. The present paper deals with the information of 33 medicinally important plants used for dental care and it has been tabularized in table. It includes alphabetically arranged Botanical names, Local names, Family, Parts used and mode treatment.

Material and Methods

The present study carried out by critical field survey of forest area of Navapur taluka, Nandurbar District. During the time of field survey, several places have been visited and information were collected of the medicinal plants which are used for dental care. The information was collected from elderly persons, tribal peoples, local medicine men called vaidu etc. The collected plant specimen was dried, pressed to prepare herbarium. They are identified and deposited in the Herbarium, Department of Botany, Jaihind Educational Trust's Z.B. Patil College, Dhule.

Table 1: List of plants used for Dental care



no	Botanical name	Local name	Family	Part used	Treatment
1	<i>Acacia nilotica</i> (L.) Wild. ex Del sub sp. Indica (Bth) Dre	Babhul	Mimosaceae	Seeds	Seed powder is used as tooth powder
2	<i>Achyranthus aspera</i> L.	Aghada	Achanthaceae	Stem Whole plant	Stem is used as tooth brush Ash of plant is used as tooth powder. It relieve pyorrhea and toothache
3	<i>Allium cepa</i> L.	Kanda	Liliaceae	Bulb	Cut a slice of raw fresh onion place it directly on the affected tooth/ gum
4	<i>Allium sativum</i> L.	Lasur.	Liliaceae	Cloves	Make a garlic paste and apply it between teeth, gum and cheek
5	<i>Azadirachta indica</i> A. Juss	Neem	Meliaceae	Stem	Stem is used as a tooth brush for healthy tooth and gums Paste of stem is applied on bleeding of gums
6	<i>Balanites aegyptiaca</i> Linn. Del	Hinganbet	Balanitaceae	Bark	Bark is kept in between jaws
7	<i>Buchanania lanzan</i> Spreng	Charoli	Anacardiaceae	Gum	Small pieces of gum kept on the affected tooth for overnight to cure toothache
8	<i>Calotropis procera</i> R.Br.	Rui/ Ruchkin	Asclepiadiaceae	Root	Fresh roots are used for toothache
9	<i>Carica papaya</i> Linn.	Papayi	Caricaceae	Latex	Latex is applied on the affected tooth/ gum
10	<i>Citrus limon</i> Burm	Nimbu	Rutaceae	Fruit	Slice of lemon & put it over the affected area, Fruit juice swish around the painful area. Fruit juice mixed with small amount of salt, apply it over the affected area of tooth / gum
11	<i>Curcuma longa</i> L.	Haldi	Zingiberaceae	Rhizome	Powder of burn rhizome are used as tooth powder, it relieves the dental pain, gum infection and abscesses
12	<i>Desmodium dichotomum</i> (wild) DC	Modri	Papilionaceae	Stem	Stem chewed and also used tooth brush.



13	<i>Desmodium gangeticum</i> (L.) Dc	Chiktya	Papilionaceae	Root	Small pieces are chewed
14	<i>Ehretia laevis</i> Roxb.	Jamavlya	Boraginaceae	Stem	Young branches are used as toothbrush
15	<i>Emblica sonchifolia</i> (L) DC	Sadhima ndhi	Asteraceae	Leaves	Juice of leaves is applied to treat toothache
16	<i>Ficus benghalensis</i> L.	Wad	Moraceae	Latex	Fresh latex is applied to treat the bleeding & swelling of gums
17	<i>Ficus religiosa</i> L.	Pimpal	Moraceae	Twig	Tender leaf twig are chewed and pressed between the teeth for 15 min. to cure toothache
18	<i>Haldina cardifolia</i> (Roxb)	Haldu	Rubiaceae	Latex	Latex is applied on aching tooth/gums
19	<i>Holorrhena pubescens</i> (Buch-Ham)Wall ex Don	Dudhkuhadi	Apocynaceae	Leaves	Fresh leaves are chewed early in the morning for a week to cure dental caries
20	<i>Jatropha curcus</i> L.	Vilayati arandi	Euphorbiaceae	Stem	Small stem is used as toothbrush to cure pyorrhea and toothache
21	<i>Jatropha gossypifolia</i> L.	Chandrajyot	Euphorbiaceae	Stem	Small stem used as toothbrush to cure toothache
22	<i>Lawsonia alba</i> Lamk.	Mehandi	Lythraceae	Bark	Bark of stem chewed and kept between the teeth for about 20 min. to cure toothache
23	<i>Madhuca langifolia</i> (Koenig) Macbride	Mahuda/Mahu	Sapotaceae	Stem	Small stem is used as toothbrush
24	<i>Mangifera indica</i> L.	Amba	Anacardiaceae	Stem Latex Flower Gum	Small stem is used as toothbrush to cure toothache Latex is applied to relieve gingivitis Make astringent mouth wash from fresh flowers to relieve pain & tooth inflammation Gum is kept on affected tooth to cure toothache
25	<i>Menth piperata</i> L.	Pudina	Labitae	Leaf	Chewing of massages of leaf relieves to dental pain.
26	<i>Mukia maderaspatua</i> (L.) Roem	Kharwad	Cucurbitaceae	Root	Root is chewed about 15 min. to relieve toothache
27	<i>Murraya paniculata</i> (L.) Jack	Kunti	Rutaceae	Stem	Fresh stem used as toothbrush
	<i>Pongamia pinnata</i> (Linn.) Pierre	Karanj	Fabaceae	Twig	Tender leaf are chewed and pressed between teeth for

					about 15 min. to cure toothache
28	<i>Psidium guajava</i> L.	Peru	Myrtaceae	Leaves	Deaf decoction is filled in mouth for few min. then repeating will relieve the toothache
29	<i>Ricinus communis</i> L.	Erandi	Euphorbiaceae	Seeds	Cotyledon is fried in mustard oil and the smoke is emitted. This process is inhaled through the mouth closed for about 15 min. to relieve dental caries
30	<i>Solanum virginianum</i> Linn.	Bhuiringni	Solanaceae	Stem fruit	Stem extract is applied over infected tooth Dried fruit powder is used in cigarette and the smoke is inhaled inside the mouth for about 15 min. to relieve caries
31	<i>Spilanthes clava</i> DC	Akkalkhar	Asteraceae	Root & Flower	Root and flower is chewed for about 10 min. to relieve dental caries.
32	<i>Terminalia chebula</i>	Hirda	Combretaceae	Twig Seeds	Fresh twig is used as toothbrush to treat toothache Fresh seed paste applied on gums
33	<i>Zingiber officinale</i> Roscoe	Adrak/Aale	Zingiberaceae	Rhizome	Pill off skin of rhizome and apply it over the affected tooth, or chewed it slowly to get its juice around the aching tooth.

Result and Discussion

The present study deals with medicinal plants which are being used traditionally for dental care in forest area of Navapur Taluka, Nandurbar District. These plants belonging to 33 species 29 genera and 19 families. Various parts like root stem, fruits, leaves, bark, seeds etc. are used for dental care. The most dominant families are Euphorbiaceae and Papilionaceae

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Need of Information in Development of Rural Farmers :

A Study of Dhule District, Maharashtra : A Survey

Shashikant P. Pawar

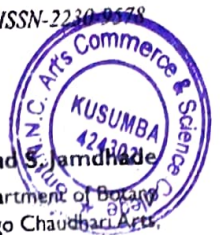
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Abstract

In everyday existence of human being, information is most basic necessity. Each & every person required information for better survival. Information can be available or obtained from a variety of sources. Our & main profession is farming. The information required to done better farming is very specific. The present paper deals with the information really needs of the farmer community is rural Maharashtra. The study conducted survey method & reveals.

Keywords: Information, farmer community, rural.

Introduction

In agriculture, relevant and beneficial information helps framers community to take right decision for agricultural development. We know that everyone requires information about everything in day to day life. If information of weather trends, market information helps farmer make correct decision about what crops to plants & where to sell their products and by inputs. Agriculture is major sector which is vital for the survival of modern man. Plants are the producers in the food chain & without the life cycle would not be possible [1].

Dhule Dist is selected as one of the pilotdistrict for the preparation of comprehensive District agricultural plan action for food production (AFTR0) [2].

Dhule district was divided into two districts Dhule and Nandurbar in 1998. The district of Dhule was previously known as west khandesh district. Dhule is 674 villages from the four district blocks Dhule, Sakri, and Shindkheda. Religions observed in the districts are Hindu, Muslim, Christy, Baudh, Jain, Sikh and others, As per census of 2011 Dhule had population of 2,048,751 (3). Total graphical area of Dhule district is 8063 sq.km Total forest area is 4.64 lakh ha. & net cropped area, 4.16% lakh ha. Out of which total net cropped area, 61% of land is used for cultivation of food grains & remaining for non edible crops.(4)

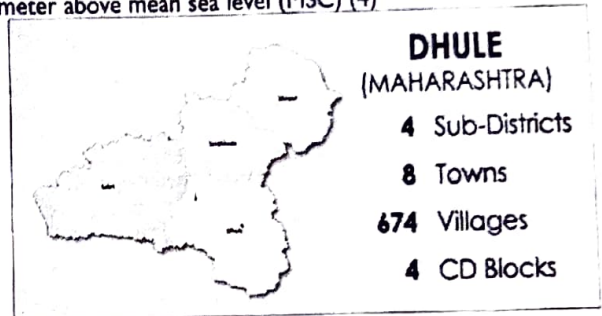
Rivers:

Rivers in the district are Tapi, Panzra, Burai, Arunawati, Aner, Bori, Kan&Aru which are prime water sources Panzrarive is having maximum length of 136 km in the district. Area under irrigation in the district is 32952 ha. Major crops cultivated are jowar, maize, green gram, bazra, tur, etc. Some economy is depends upon the cattle's for the development of agriculture.

Dhule is located in northern side of Maharashtra state bounded by district Nandurbar in the North West district Nasik in South & district Jalgaon in east. Elevation of the district form mean sea level ranges from 180 to 215

Graphical location:.

The district is located at 200.38 to 210.61N and longitude of 730.50 to 750.11 E with attitude of 180 to 250 meter above mean sea level (MSC) (4)



Map of Dhule District

Climate:

The district has warm and dry climate in June& September. The annual rainfall of 717 mm & rainfallvaries from place to place (5).

Methodology:

The Survey method was used to conduct the following data used as a data collection for fallings of the objective of the study. The data collected through question basis, Observation & informal interviews. The tables were prepared using MS-Word(1).

Scope and limitation:

The scope of the study is limited to the farmers of Dhule district only whose main occupation is agriculture. This information collected was based on a small farmers & it is not used for entire population.

Data Analysis:

Table 1: Responding farmers information

S r . No	Type of data	Response	Percentage
I.	Language Known		
	Marathi	150	100%
	Hindi	45	30%

	English	20	13.3%
2.	Age in Years		
	20-30	15	10%
	31-40	48	32%
	41-50	60	40%
	50 & Above	27	18%
3	Education State		
	Illiterate	30	20%
	Secondary Education	80	33.33%
	Graduation & P.G	15	10%
	Others	25	16.66%

The above data indicates that all responding know the Marathi languages because nativeness of language respondent's knows English language. The highest percentage belonging the age groups 41-50 years followed age groups of 31-40 (40%) under educational status, maximum no of persons i.e. (53.73%) completed higher secondary school = 16.66% are pass out diplomas while, 10 % are graduates & 20% illiterate.

Table 2 : Use of mobile phones by farmers

Sr. No	Age	No. of Responds	Percentage
1.	20-30	15	10%
2.	31-40	45	30%
3.	41-50	55	36.66%
4.	50- Above	20	13.33%

The result shows that (89.99%) using mobile phone for communication & other purpose. It is good sign of farmers of the rural area now Familiar with Mobile phones.

Table 3 : Information needs by farmers :

Sr. No	Age	No. of Responds	Percentage
1.	Daily	60	40%
2.	Sometime	75	50%
3.	Never	15	10%

From the above maximum percentage (50%) data farmers requires information sometimes & majority (40%) of the farmers need daily information only 10% farmer are state that they do not require information for agriculture activities.

Table No 4 : Areas of information needs of the farmers.

Sr. No	Item	Frequency	Percentage
1.	New crop production	125	83.33
2.	Seeds availability	118	78.66
3.	Insecticides availability	110	73.33
4.	Water Management	65	43.33
5.	Fertilizer Availability	112	47.66
6.	Weather information	30	20%
7.	New agricultural information	21	14%

From above table, majority of farmers need information on availability of new crop production, (88.33), Fertilizer availability (74.66), weather information (20%), & new agricultural information (14%).

Table No 5 : Information needs of the farmers regarding the farming activities

Sr. No	Item	Frequency	Percentage
1.	Market information of agriculture production	136	84%
2.	Bank Credit information	65	43.33%
3.	Transport Facilities	71	47.33%
4.	Government scheme	101	67.33%
5.	Animal Husbandry	22	14.06%
6.	Crop Insurance	41	27.33%
7.	Irrigation	18	12%
8.	Medical Plants	08	5.3%
9.	Milk Production	28	18.66%

Table Shows 84% of farmers require market information & 67.66 requires information about government schemes. Most of the farmer's requires transporting knowledge most of the farmers also need of information about bank credit cards

Table 6 : Sources of information used by Farmers

Sr. No	Item	Frequency	Percentage
1.	Newspaper	108	72%
2.	Magazines	22	14.66%
3.	Radio	18	8.66%
4.	Public library	07	4.66%
5.	T.V	73	48.66%
6.	Other farmers of college farmers	110	73.33%
7.	Agricultural Exhibition	33	22.00%
8.	Government Offices	97	64.66%

Discussion:

The investigator found that most of the farmers of Dhule rural areas require information relating to their agriculture activity from Newspaper. The few farmers taken information from television, agricultural exhibition & magazines so, It was found that 89.99% mobile phone were used for some agricultural activity. Again most of the farmers requires information from government offices & market agencies have started to send daily information through general news recent development, soil, management, whether information etc. (1).

The majority of farmers used television (48.66%) & newspaper (72%) as a information sources but the illiterate farmers are unable to take information from these sources because of illiteracy. The most common newspaper used for such kind of information is Agro-One newspaper published in Marathi language provides good information about the recent agricultural activity

awareness about the water management technique amongst farmers. The Investigator also found that most of the government offices in rural areas are not well developed due to shortage of facilities such as computerize laboratory, internet facilities, overall the investigator found most of the farmers from Dhule rural area required information about the recent developments in agriculture sector.

Conclusion:

This study has provided the power of information in the agricultural sector as a whole. The study also reported that farmers must know recent development & facilities about the agricultural field using various information

sources like, Internet. This information provides agricultural development in rural areas due to increase in information the productivity of crops increases and it directly affects on rural development.

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19. Diversity of Family Meliaceae from Forest Area of Navapur Taluka, Nandurbar District, (Ms)

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Abstract

Meliaceae is important family of flowering plant. It is used as oil, medicines, timber, ornamentals etc. The present study deals with diversity of family Meliaceae from forest area of Navapur Taluka, Nandurbar District (MS). It is very pleasant place surrounded by hills of dense forest of Northern Western Ghat from one side. The flora of this region is highly diversified in vegetation, rich in floristic composition and contains considerable number of important species.

Key words: Diversity, Meliaceae, Forest, Navapur, Nandurbar.

Introduction

The Family Meliaceae is commonly called mahogany or neem family. It includes about 50 genera and more than 1400 species according to Willis distributed all over the world. In India it is represented by 20 genera and 70 species with great diversity of habitat Morphology, Ecology etc. The objective of the study is To study of diversity especially morphology of family Meliaceae from forest area of Navapur Taluka, Nandurbar District (MS). Navapur is one of the six taluka of Nandurbar. It is located between 21°09'-21°15' latitude 73°48'-70°80' longitude of Nandurbar District. The forest of this area is mainly dry deciduous type due to moderate rainfall. The forest is intermixed with hamlets and villages. The present paper deals with morphological descriptions of 4 genera and 4 species of family Meliaceae. It has been tabularised in table. It includes alphabetically arranged botanical names, local names and morphological description.

Primitive Characters

1. Plants are mostly trees or shrubs
2. Leaves are alternate and pinnately compound
3. Heterogenous wood rays

4. Presence of secretory cells
5. Flowers actinomorphic, hermaphrodite and hypogynous type
6. Calyx, corolla and stamens free
7. Pollination is entomophilous type.

Advance Characters

1. Leaves mostly compound and exstipulate
2. Flowers are small in size
3. Cymose or racemose type inflorescence
4. Reduction in number of sepals, petals and stamens
5. Monoadelphous stamens
6. Syncarpous ovary
7. Axile type placentation
8. Simple Fruits.

Material and Methods

The present study carried out by critical field survey in the different parts, of forest area of Navapur taluka, Nandurbar District. During the time of Field survey, Several places have been visited and information was collected from elderly persons, tribal peoples, local medicine men called vaidu etc. The collected plant specimens was dried, pressed to prepare Herbarium. They are identified and deposited in the herbarium of Department of Botany, Jaihind Educational Trust's Z.B. Patil College, Dhule.

Sr. no.	Botanical name	Local name	Morphological Description
1	Azadirachta indica A.Juss	Neem, Kadu-neem	Evergreen Trees, 15-20 m tall. Stem is branched, longitudinally fissured, bark light black, branches are wide and spreading. Leaves unipinnate 20-35 cm long leaflet 7-17, 3.5-7.5×1.0-2.2 cm, crowded near the end of branches ovate, lanceolate, glabrous, serrate, acute, acuminate. Flowers white arranged in more or less drooping, axillary panicles, fragrant. Fruit Drupe 1.5-2.6×1.0-1.5 across, glabrous, yellow, exocarp thin, mesocarp is fibrous yellowish white. Seeds 0.2-0.5 cm long hard, ellipsoid glabrous.
2	Chloroxylon switenia DC	Halda, Billu	Medium sized tree grows up to 9-12 m. tall. Stem is woody, much branched, bark is slightly corky and



			thick. Leaves are 15-23 cm long abruptly pinnate, leaflets 10-20 pairs. Alternate or sub-opposite, oblong, obtuse, 1.6-4.2×0.5-1.0 cm, glabrous. Flowers are small creamy white, terminal or axillary panicle, many. Fruit Capsules, 2.5-4.5 cm long, oblong, glabrous. Seeds numerous, brown.
3	Melia azedarach L.	Bakam, Bakam-neem	Medium sized tree 4.5-7.0 m tall. Stem Stout, branched, longitudinally furrowed dark brown. Leaves bipinnate, crowded near branch ending, leaflet 3-12, ovate 1.3-6.2×0.6-1.2 cm, obtusely serrate, acuminate at apex, round at base, glabrous. Flower in axillary panicle, white with purple tinge, fragrant. Fruit Drupe, greenish-yellow, globose, ellipsoid-oblong, 1-1.5 cm across. Seeds elliptic yellow when ripe.
4	Soymida febrifuga (Roxb)	Rohin, Rohan	Trees, 8.0-15.0 m deciduous tree, stem with rough bark, dark brown to black, exfoliating in large plates or scales. Leaves peripinnate, crowded at the end of branches, 20-40 cm long, leaflets 7-13, 3.5-7.5×2.4-5.5 cm opposite, ovate-oblong or elliptic-oblong, glabrous, entire or undulate, obtuse, coriaceous, glabrous, thick. Flowers greenish-white, 15-30 cm long, 0.8-1.1 cm across, axillary and terminal divaricately branched, panicle. Fruit capsule, woody, 2.4-7.0×2.3-5.6 cm across, 5 valved, blackish-brown. Seeds oblong, winged.

Result and Discussion

The present study deals with diversity especially morphology of 4 genus and 4 species of family Meliaceae from forest area of Navapur Taluka, Nandurbar District (MS).

Acknowledgement

Authors are grateful to forest Department of Maharashtra State, Principal Dr. P.H. Pawar, Dr. Neelima Patil Head Department of Botany, & Dr. Mathew Varghese Jaihind Educational Trust's Z. B. Patil College, Dhule for providing necessary facilities and support.

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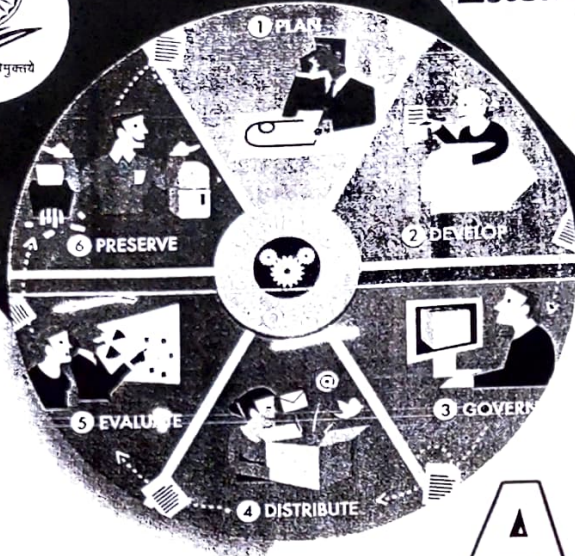
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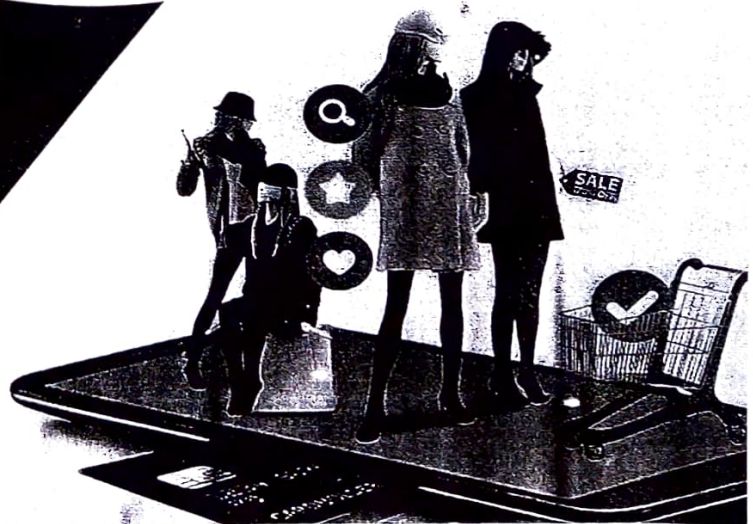
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9. Diversity of Family Solanaceae from Forest Area of Navapur Taluka, Nandurbar District, (MS)



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Abstract

Solanaceae is important family of flowering plant. The present study deals with diversity of family Solanaceae from forest area of Navapur Taluka, Nandurbar District (MS). The forest of this area is mainly dry deciduous type. It is a part Western Ghats. The flora of this region is highly diversified in vegetation, rich in floristic composition and contains considerable number of important species.

Key words: Diversity, Solanaceae, Forest, Navapur, Nandurbar.

Introduction

The Family Solanaceae is commonly called night shade or Datura family consist of about 98 genera and more than 2700 species distributed all over the world. About 21 genera and 88 species are found in India with great diversity of habitat Morphology, Ecology etc. The members of this family are annuals, biennials or perennials and are usually herbs, shrubs and trees. The objective of the study is To study of diversity especially morphology of family Solanaceae from forest area of Navapur Taluka, Nandurbar District (MS). The present paper deals with morphological descriptions of 5 genera and 11 species of family Solanaceae. It has been tabularised in table. It includes alphabetically arranged botanical names , local names and morphological description.

About Study Area

Navapur is one of the six taluka of Nandurbar. It is located between 21°09'-21°15' latitude 73°48'-70°80' longitude of Nandurbar district. It is very pleasant place surrounded by hills of dense forest of Northern Western Ghat from one side. The forest is intermixed with hamlets and villages

Material and Methods

The present study carried out by critical field survey in the different parts, of forest area of Navapur taluka, Nandurbar District. During the time of Field survey, Several places have been



visited and information was collected from elderly persons, tribal peoples etc. The collected plant specimens was dried, pressed to prepare Herbarium. They are identified and deposited in the herbarium of Department of Botany, Jaihind Educational Trust's Z.B. Patil College, Dhule.

Sr. no.	Botanical name	Local name	Morphological Description
1	<i>Datura innoxia</i> Mill	Dhotra	It is stout herb 0.8 to 1.2 m tall. Stem is branched, densely tomentose, hairy. Leaves broadly ovate 9.2 - 16.2. × 5.5-8.8, hairy, entire, slightly sinuate or irregularly lobed at the base, petiolate, flowers axillary terminal cymose. Pedicilate, white, persistence calyx, corolla infundibuliform, 12-18cm long, fruit is globose spiny capsule 3.5-5.6 across, dehiscent. Seeds glabrous reniform pale to dark brown.
2	<i>Datura metal</i> L.	Kala Dhotra	Erect, glabrous & stout herb up to 60-91 cm tall. Stem is herbaceous, hollow with strong odour, purple. Leaves simple 11-16×8-10.5 cm, alternate petiolate, exstipulate, entire or deeply lobed, glabrous. Flowers axillary solitary, white, calyx persistent, corolla infundibuliform. Fruit globose capsule 2-3 cm across covered with numerous straight spines. Seeds-orbicular glabrous, flat, smooth endospermous.
3	<i>Nicandra physalodes</i> (L)	Goti, Fokala- andu	Erect leafy herb up to 1m tall. Stem is erect, glabrous, with spreading branches. Leaves 5-14×3-7 cm, ovate-oblong, toothed, glabrous, acute. Flowers solitary, axillary, bluish-white, pedicilate, bell-shaped, 3-5 cm in diameter. Fruit berries, globose enveloped by inflated persistent calyx. Seeds numerous, minute, testa thick, brown.
4	<i>Physalis angulata</i> L.	Popti	Erect branched herb, 80-150 cm tall. Stem is glabrous, angular, ribbed. Leaves 3-14×2-9 cm ovate, elliptic, acuminate, cuneate or rounded at the base, petiole 3-4 cm long. Flowers solitary, terminal, seemingly axillary, 5 sided pale yellow, 5 small brown spot within. Seeds



			reinform, flat, pale yellow.
5	<i>Physalis minima</i> L.	Ran popti, Chirboti	Erect herb up to 25-50 cm tall. Stem profusely branched, angular, glabrous or pubescent. Leaves 2.5-12×1.5-5 cm, broadly ovate elliptic-oblong, soft, smooth, entire or serrate, petioles 0.5-3.5 cm long. Flowers solitary, axillary, pale yellow, 0.5-1.0 cm across peduncle 1.0-2.0 cm long. Fruit berries, globose, 1.0-1.4 cm across glabrous, encapsulated in papery cover, orange yellow.
6	<i>Solanum anguivi</i> Lamk	Ringni, Deoringni	Under shrub, stout, 50-140 cm tall, hairy. Stem branched, often purple, densely stellate tomentose. Leaves 5.0-13.2×2.1-8.1 cm broadly ovate, sub entire or irregularly dentate, acute, petiolate. Flower purple, 1.0-1.5 cm across, pedicellate, calyx hairy, corolla rotate 0.8-1.2 cm long. Fruit berry, globous 0.7-1.0 cm across, glabrous, orange-red. Seeds numerous, flat, smooth, oblong, or spherical, rarely sub reinform, yellow.
7	<i>Solanum incanum</i> L.	Ubhi-ringni	Under shrub up to 150-200 cm tall. Stem is stout branched, densely clothed with stellate hairs. Leaves 4.5-12×1.9-5.8 cm, ovate, slightly wavy, acute, stellate hairs on both sides, petioles 0.5-2.5 cm prickly on the veins. Flowers purple-white, 1.1-1.6 cm across, calyx fused, corolla bell or wheel shaped. Fruit berries 1.5-2 cm across, globose yellow on ripe. Seeds many green to orange-red.
8	<i>Solanum nigum</i> L.	Kamuni	Erect herb, 40-70 cm tall. Stem branched, branches often purple-green, glabrous or sparsely hairy. Leaves broadly ovate 1.2-8.1×0.8-4.9 cm, entire or crenate, acute, sparsely hairy on both surface, petiolate. Flowers creamy-white 0.6-1.1 cm across, 3-8 in extra axillary, sub umbellate cymes, peduncle 0.6-1.1 cm long, pedicellate, corolla rotate. Fruit berries 0.5-0.8 cm across, globular, dull black or purplish-black. Seeds numerous small yellowish-brown.



9	<i>Solanum surattense</i> Burm	Guiri	Prickly diffused herb, heavily armed, spreading. Stem branched, dense stellate tomentum. Leaves 5.5-10.6×1.5-6.2 cm, ovate, elliptic or oblong, stellate hairs on both sides, petioles 0.6-2.5 cm long. Flowers bluish-violet, 1.4-1.6 cm across, in extra axillary, pauci florous cyme, pedicellate, calyx densely hairy and prickly, corolla rotate. Fruit berries 1.2-2.0 cm across, globose covered by enlarged calyx, yellowish-red. Seeds many, sub-reniform, yellowish-brown.
10	<i>Solanum virginianum</i> L.	Bhuiringni, Ran-wange	Diffuse or prostrate herb, 40-60 cm tall. Stem zig-zag, clothed with stellate hairs armed with sharp straight needle like broad based yellow prickles 0.4-2 ×0.05-0.15 cm. Leaves unequal paired, prickly ovate-oblong 5-11×2.5-5cm, armed sinuate, acute. Flowers purple-blue, 1.5-2.5 cm across, in extra axillary few flower cymes or solitary. Fruits berries, 1.2-2.2 cm across, globose, pale yellow. Seeds reinform, pale yellow.
11	<i>Withania somnifera</i> (L)	Ashwagandha	Erect under shrub 70-180 cm tall. Stem is branched, hairy, leaves 5.0-9.5×3.2-5.0 cm, ovate, entire to slightly wavy, sub acute, hairless above and densely hairy below, petioles 0.8-1.5 cm. Flower small 1-7 in sessile or sub sessile umbellate cyme, greenish-yellow. Fruit berries 0.5-0.8 cm across, globose, slightly 5 angled, orange-red. Seeds numerous, oblong or spherical, smooth, pale yellow.

Result and Discussion

The present study deals with diversity especially morphology of 5 genus and 11 species of family Solanaceae from forest area of Navapur Taluka, Nandurbar District (MS). The most dominant genera are *Solanum*, *Datura* and *Physalis*.



Acknowledgement

Authors are grateful to forest Department of Maharashtra State, Principal Dr. P.H. Pawar, Dr. Neelima Patil Head Department of Botany, & Dr. Mathew Varghese Jaihind Educational Trust's Z. B. Patil College, Dhule for providing necessary facilities and support.

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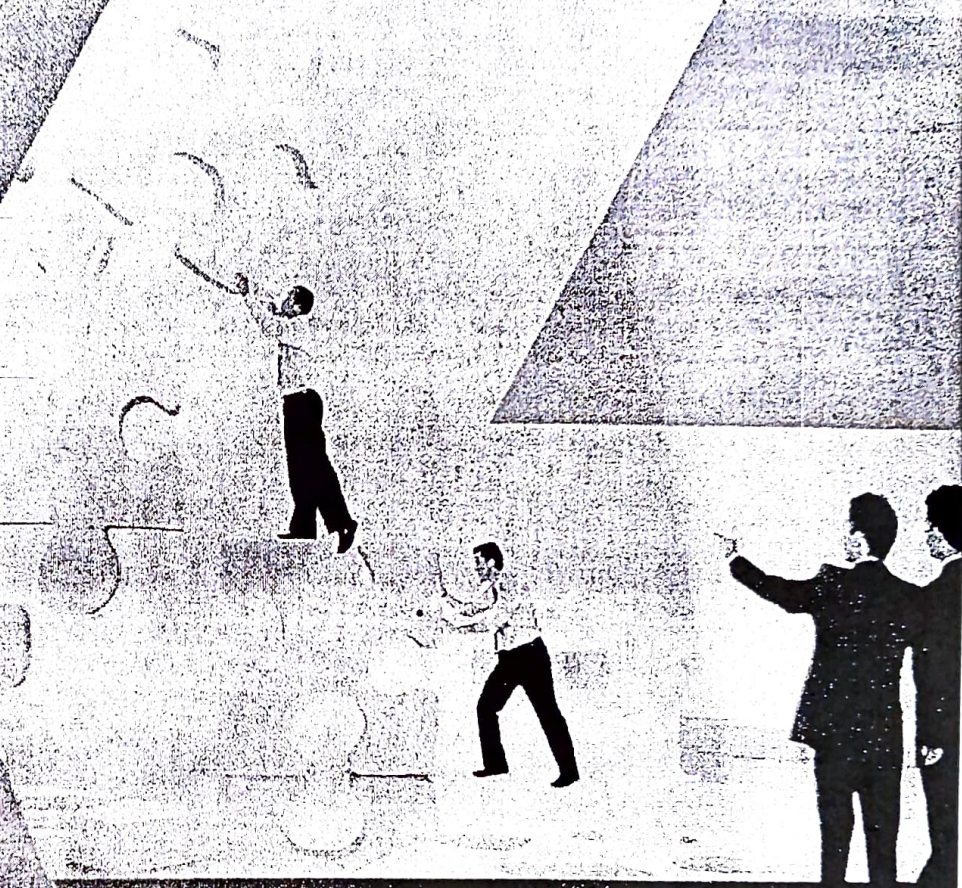
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21. A Study of Economic Analysis of Climate Change

Ahire Ramesh C.

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Abstract

The present study is an attempt to analyze the impact of climate change on economy. The present work is based on various reports published by government panel and private research agencies. Putting climate change in the framework of economic analysis, we have consider greenhouse gas emissions, which cause planetary warming and other changes in weather patterns, as both a cause of environmental externalities.

Key Words: Economic analysis, Climate Change.

Introduction

Scientists have been aware since the 19th century of the planetary impacts of carbon dioxide (CO₂) and other greenhouse gases in the atmosphere. In recent decades, concern has grown over the issue of global climate change caused by increased accumulations of these gases. The problem often referred to as global warming is more accurately called global climate change. A basic warming effect will produce complex effects on climate patterns with warming in some areas, cooling in others. Putting climate change in the framework of economic analysis, we can consider greenhouse gas emissions, which cause planetary warming and other changes in weather patterns, as both a cause of environmental externalities and a case of the overuse of a common property resource.

The atmosphere is a global commons into which individuals and firms can release pollution. Global pollution creates a "public bad" affecting everyone—a negative externality with a wide impact. Many countries have environmental protection laws limiting the release of local and regional air pollutants. In economic terminology, such laws to some degree internalize externalities associated with local and regional pollutants. But until relatively recently, few controls existed for carbon dioxide (CO₂), the major greenhouse gas, and concentrations of CO₂ in the atmosphere have risen steadily, recently crossing the benchmark of 400 parts per million



atmospheric concentration and increased climatic variability and extreme weather events. Impacts of climate change have already begun to affect climate patterns.

Objectives

The main objectives of the present work are following:

- To study economic analysis of climate change.
- To analyze impact of climate change on economy.

Database and Methodology

The present paper intends to analyze the economic analysis of climate change entirely based on secondary sources of data collected from various national and international level agencies and panel reports of global warming and climate change.

Trends of Global Climate

The earth has warmed significantly since reliable weather records began to be kept in the mid-nineteenth century. In the past 100 years, the global average temperature has risen about 1°C, or about 1.8°F. Fourteen of the fifteen warmest years in the modern meteorological record have occurred from 2000 to 2015. The record of 2014 as the hottest year ever recorded was broken by the year 2015, which in turn was broken by 2016, which was about 1.1°C above pre-industrial levels. Evidence indicates that the rate of warming, currently about 0.13°C per decade, is increasing. The US Department of Energy's Pacific Northwest National Laboratory estimates that the rate at which temperatures are rising could be 0.25°C per decade by 2020.

Not all areas are warming equally. The Arctic and Antarctica have been warming at about double the global rate. Melting ice in the Arctic is both a result of global warming and a cause of further warming, since Open Ocean absorbs more of the sun's energy than ice, a phenomenon known as reduced albedo. Warmer temperatures have produced noticeable effects on ecosystems.

Climate change is also leading to rising sea levels. Sea-level rise is attributed to the melting of glaciers and ice sheets and to the fact that water expands when it is heated. In 2012, the global average ocean temperature was about 0.5°C above the 20th century average. The combination of warmer oceans and melting ice has led sea levels to rise about 2 millimeters per year, and in 2012 the sea level was already 9 inches (23 cm) above the level of 1880. The impact of rising seas threatens numerous coastal areas. In addition to Rising Ocean temperatures, increased CO₂ in the atmosphere results in ocean acidification.



Economic Analysis of Climate Change

Scientists have modeled the results of a projected doubling of accumulated CO₂ in the earth's atmosphere. Some of the many negative predicted effects are:

- Loss of land area, including beaches and wetlands, because of sea-level rise.
- Loss of species and forest area.
- Disruption of water supplies to cities and agriculture.
- Increased air conditioning costs.
- Health damage and deaths from heat waves and spread of tropical diseases.
- Loss of agricultural output due to drought.

Some beneficial outcomes might include:

- Increased agricultural production in cold climates.
- Lower heating costs.
- Fewer deaths from exposure to cold.

The potentially beneficial outcomes would be experienced primarily in northern parts of the Northern hemisphere. Most of the rest of the world, especially tropical and semi-tropical areas, are likely to experience strongly negative effects from additional warming. According to IPCC projections, with increasing emissions and higher temperatures, negative effects will intensify and positive effects diminish. Other less-predictable but possibly more damaging and permanent effects include:

- Disruption of weather patterns, with increased frequency of hurricanes, droughts, and other extreme weather events.
- A possible rapid collapse of the Greenland and West Antarctic Ice Sheets, which would raise sea levels by 12 meters or more, drowning major coastal cities.
- Sudden major climate changes, such as a shift in the Atlantic Gulf Stream, which could change the climate of Europe to that of Alaska.
- Positive feedback effects, such as an increased release of CO₂ from warming arctic tundra, which would speed up global warming.

There is considerable uncertainty about the expected global warming in the coming century. We need to keep such uncertainties in mind as we try to evaluate economic impacts of global climate change. Given these uncertainties, some economists have attempted to place the



analysis of global climate change in the context of cost-benefit analysis. We will first examine economists' efforts to capture the impacts of global climate change through cost-benefit analysis.

Cost-Benefit Studies of Global Climate Change

Without policy intervention, carbon emissions in a business-as-usual scenario would be expected to continue to rise. When economists perform a cost-benefit analysis, they weigh the consequences of the projected increase in carbon emissions versus the costs of current policy actions to stabilize or even reduce CO₂ emissions. Strong policy action to prevent climate change will bring benefits equal to the value of damages that are avoided. These benefits of preventing damage can also be referred to as avoided costs. The estimated benefits must then be compared to the costs of taking action. Higher ranges of temperature change lead to dramatically increased damage estimates at the global level. Different models yield different estimates for future damages and in turn different impacts on the economy, ranging from 2% to 10% or more of global GDP per year, depending on the global mean temperature rise. The IPCC estimates of likely temperature change by 2100.

Findings and Conclusion

Climate change is an issue that embodies issues of externalities, common property resources, public goods, renewable and nonrenewable resources, and the discounting of costs and benefits over time. It has economic, scientific, political, and technological dimensions. Economic analysis alone cannot adequately respond to a problem of this scope, but economic theory and policy have much to offer in the search for solutions.

An effective response to the climate change problem requires much more sweeping action on a global scale than anything so far achieved. Economic policy instruments that have the power to alter patterns of energy use, industrial development, and income distribution are essential to any plan for mitigating or adapting to climate change. Evidence of climate change impacts is already clear, and the issue will become more pressing as greenhouse gas accumulation continues and costs of damages and of climate adaptation rise.

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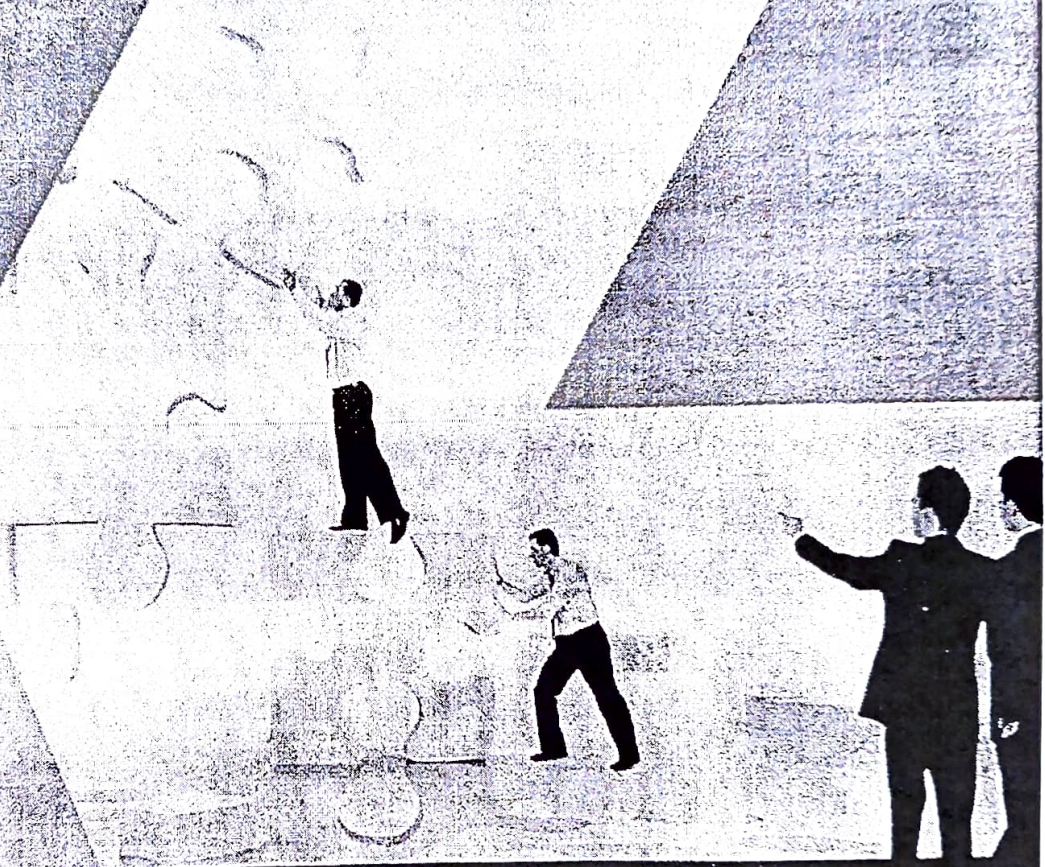


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8. Socio-Economic Status of Population in Anjani River Basin of Jalgaon District

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Abstract

In human life water is an acquired a great importance, without water man does not perform any action. All phenomenon's of human beings are depended on water availability. On the earth surface about 70.8% proportion acquired by water and 29.2% by land. Out of 100% water only 1% is the surface running water, in the forms of rivers. Human civilization was developed and spread all over from major river basin. Hence, the importance of river basin is also great interested study topic. In Jalgaon district of Maharashtra state has a great important region in the countryside. River Anjani is flowing in the western part of the district. River Anjani is the one of main tributary of River Girna and river Girna is the main tributary of river Tapi. Objective of the present research study to find out the socio economic conditions in Anjani river basin on the present days. The present study conducted will be based on surveying method. Researcher will arrange a survey for the collection of data for analyzing and interpretation of present study. In the study region 27 villages are affected by Anjani river project out of them 1 is talhsil place.

Present study reveals, social and economical components affect the development of the region. In Anjani river basin area having distinct physical setting as well social variations was responsible diverse occupational structure. Different religious group population having different sex ratio, literacy, occupational status, living standards and having income.

Key Words : Sex Ratio, Literacy, Religion, Caste, Occupation

Introduction

On the earth surface various natural resources are formed from origin of the earth. Out of them water is the main natural resources. Availability of the water is main cause for origin of life on the earth. Hence, an earth is known also water planet or green planet.



In human life water is an acquired a great importance, without water man does not form any action. All phenomenon's of human beings are depended on water availability. On the earth surface about 70.8% proportion acquired by water and 29.2% by land. Out of 100% water only 1% is the surface running water in the forms of rivers.

The river system is occupied a great natural as well as cultural importance in any region on the earth surface. Human civilization was developed and spread all over from major river basin. Hence, the importance of river basin is also great interested study topic. In Jalgaon district of Maharashtra state has a great important region in the countryside. River Anjani is flowing in the western part of the district. River Anjani is the one of main tributary of River Girna and river Girna is the main tributary of river Tapi.

Objectives of Research Work

To find out the socio-economic conditions in Anjani river basin on the present days.

Research Methodology

The present study conducted will be based on surveying method. Researcher will arrange a survey for the collection of data for analyzing and interpretation of present study. In the study region 27 villages are affected by Anjani river project out of them 2 are Tahsil place all researcher has prepared a questionnaires for getting information about village and their own socio economic characteristics, and he will be filled from village Panchayat office of hat village.

Researcher will be prepared another questionnaires 4 village, those are migrated from their original location due to the construction of Anjani project from these questionnaires information getting about rehabilitation facilities in this village and the evaluation of quality of socio-economic conditions of the population in these village. Geographical, Geomorphological, Cultural information and data will be collect from SOI topographical maps, Satellite imaginaries, and remote sensing data and interpret them with the help of GIS.

Study Region

Anjani River is tributary of Girna River which is itself a major tributary of Tapi river in part of Maharashtra state, India. Anjani River originates near Achalgaon village in Bhalgaon Tahasil of Jalgaon District. Its coordinate is Longitude $75^{\circ}09'E - 75^{\circ}20'E$, and Latitude $20^{\circ}45'N - 21^{\circ}08'N$, confluence of Girna and Anjani River near Babhulgaon Village of Dharangaon. Total Length Is Approx 50Km. Average Elevation 171meter (561feet) Confluence Of Girana - Anjani River Is Near Babhulgaon Village In The Dharangaon Taluka The Northern Boundary Of



Here table shows the population in 24 villages and one urban area of Anjani river basin. Population of the village is depend on the area of village, acquired agricultural area. Only Fardol urban area having most population due to their significance of Tahsil place. On the other hand Pimpri Kh, Sonawand BK, and Farkande villages having large size population in the river basin. In 1951, Pimpri Kh, Village having low population (798) than other villages, but in year 2011 Pimpri Kh having toppest population (4251) in the study area.

Table No. 1.2 Religion Wise Sex Ratio

Religion	Total number of family	Sample population		Sex Ratio	Boys	Girl	Child Sex Ratio
		Male	female				
Hindu	194	449	392	873	255	198	776
Muslim	23	58	65	1120	36	43	1194
Buddhist	41	77	87	1129	36	46	1277
Jain	02	03	03	1000	01	01	1000
Total	260	587	547	932	328	288	878

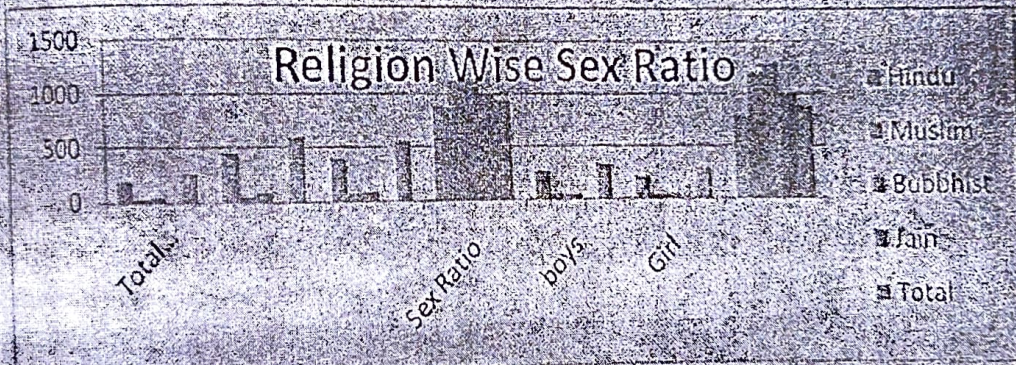


Table represents out of 260 families in the study region having different sex ratio by measuring their religious status. In the study region Hindu religion having low sex ratio (776) than Muslims, Buddhists and Jains. Child sex ratio for the Muslim and Buddhist religion was still high than the overall sex ratio. Jains community having stable sex ratio for children's as well as overall.

Table No. 1.3 Caste wise Sex Ratio

Caste	Total number of family	Sample population		Sex Ratio	Boys	Girl	Child Sex Ratio
		Male	female				
SC	41	77	87	1129	36	46	1277
ST	32	73	76	1041	42	43	1024
NT	13	36	40	1111	25	26	1040

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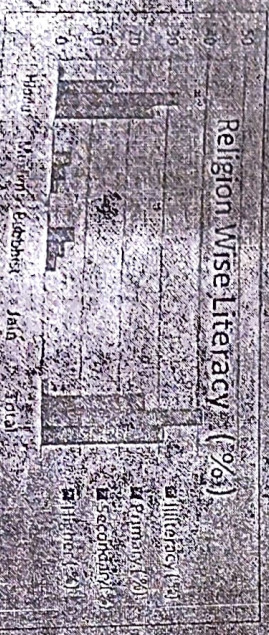
MALE	245	213	809	132	108	280
FEMALE	156	131	840	92	70	250
TOTAL	401	344	1649	224	178	530

Table shows OBC and Other community has the low sex ratio for overall and ST has the highest sex ratio. Average sex ratio was 919 in the Anahatnagar basin.



Table No. 13 Religion Wise Literacy (%)

Religion (%)	Literary (%)	Primary (%)	Secondary (%)	Higher (%)
Hindu	1.15	14.75	32.28	26.01
Victor	0.28	4.76	3.79	2.02
Buddhist	0.44	6.98	4.59	2.65
Jain	0.00	0.00	0.00	0.53
Total	1.85	26.28	40.65	31.21



Graph represents religion wise literacy in the study region. Variation was seen in literacy rate for different religion population. Hindu religion population having highest literacy (14.75%) in the study region than the other religious groups. Higher education is highest in Hindu religious population followed by Hindu, Buddhist and Muslim religion.

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Table No. 15 Caste wise Literacy (%)

Caste (%)	Literary (%)	Primary (%)	Secondary (%)	Higher (%)
SC	0.44	6.99	4.59	2.65
ST	0.26	2.02	1.00	0.79
NT	0.69	1.32	4.67	0.61
OBC	0.50	7.08	10.49	20.01
OPEN	1.56	7.05	10.34	7.14
Total	1.85	26.28	40.65	31.21

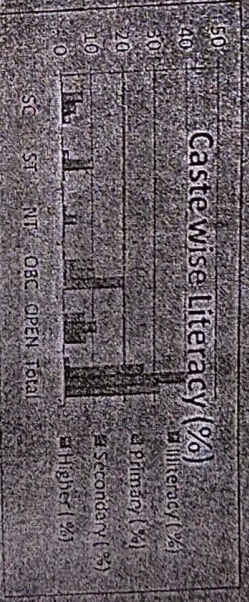


Table shows caste wise literacy in the study region. Variation was found in literacy rate for different caste group. OBC population having high literacy rate in the study region than the other caste groups. Open, Scheduled Caste, Scheduled Tribe and Nomadic Tribe population having low literacy in the study region.

Table No. 16 Caste wise Occupational Structure (%)

Caste (%)	Agriculture (%)	Trade (%)	Business (%)	Labour (%)	Other (%)	Complex (%)
SC	1.15	0.80	0.44	8.99	5.79	0.89
ST	0.44	0.00	0.00	9.88	2.82	0.00
NT	0.79	0.00	0.00	3.53	2.20	0.09
OBC	9.52	0.00	0.44	15.25	12.17	3.0
OPEN	12.3	0.26	2.02	13.76	4.76	30.26
Total	6.14	0.26	3.0	11.41	25.75	3.44

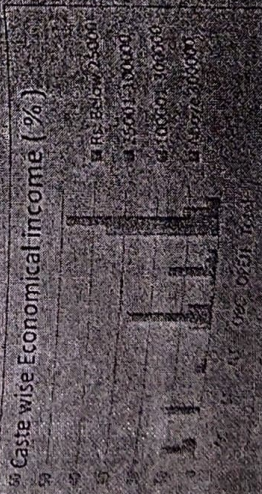
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Maximum population was engaged in agricultural sector in the nature of labour in the rural area. Marginal workers are the responsible employment in the rural area. Other marginal workers found in large proportion followed by business in rural area. Trade and business sector was not developed and don't gaining employment. Their reports impact on their occupational structure in the study region.

Table No.11: Caste wise Economical income in Rs. (%)

Caste	<25000	25000 to 100000	Above 100000
SC	11.15	0.00	0.00
ST	17.71	0.00	0.00
NT	3.46	1.54	0.00
OBC	6.92	7.69	1.15
OPEN	1.92	15.0	3.35
Total	15.77	48.46	11.54



Here caste plays the role of occupational structure in the study region. Occupational structure in rural area is different. Marginal workers found in the rural area. Open employment found in large proportion followed by SC, ST and NT population. Business and trade sector was not developed and don't gaining employment. Their reports impact on their occupational structure in the study region. Overall that condition was favourable for the agricultural development in the rural area. Resource in India, agriculture is the primary and main employment sector for population.

Conclusions
 Conclusion of the present study with and economic components affect the development of the region in Andhra Pradesh rural area based on different occupational structure. Social conditions and economic components of rural area. Different castes found population having different social and economic occupational structure. Marginal workers and business in rural area. Trade and business sector was not developed and don't gaining employment. Their reports impact on their occupational structure in the study region. Overall that condition was favourable for the agricultural development in the rural area. Resource in India, agriculture is the primary and main employment sector for population.

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Gender population was engaged in agricultural sector in the nature of labour, but availability of water irrigation facilities are their responsible employment in this area from the year. Other marginal workers found in large proportion followed by domestic in rural area trade and business sector was not developed and don't bringing any success. Social strata on their occupational structure in the study region.

Table No. 17 Caste wise Economical income in Rs. (%)

Caste	<25000	25000-100000	Above
SC	1.15	0.00	0.00
ST	1.31	0.00	0.00
OT	3.46	0.00	0.00
OBC	0.92	27.31	7.69
OPEN	1.92	15.0	1.85
Total	15.77	43.46	11.54

Table No. 18 Caste wise Economical income in Rs. (%)



It is clear from the graph that the SC and ST group are occupational structure in the study region. Occupational structure are affected on their income. Major income are received by the OBC and Open community groups followed by SC, ST and ST population groups. Agricultural farmers having marginally high income than the agricultural or marginal laborers. Overall low third population (45.77%) hardly annual income below Rs. 25000. It means that low SC & ST population in the study region comprises Below Poverty Line (BPL).

Conclusion of the present study rural area economic development affects the development of the region. In addition to that area having distinct physical setting as well social variations like responsible culture, occupational structure. Different religious group population having different castes, thereby occupational structure having marginal and having income. Overall that condition was favorable for the agricultural development in the rural area. Because in this agricultural is the primary and main employment sector in the study area.

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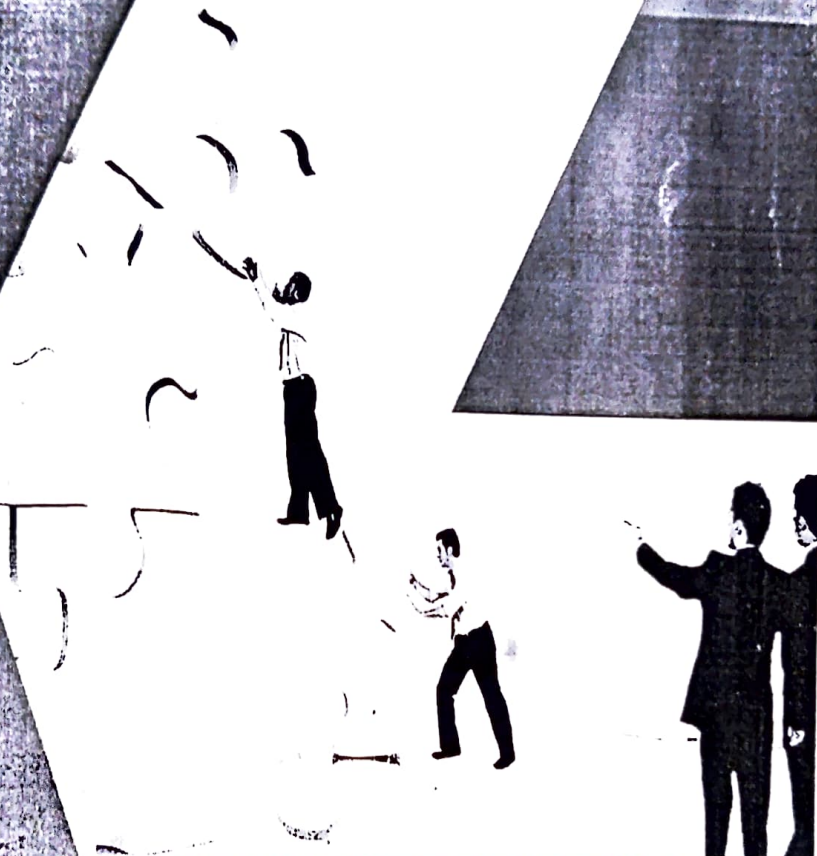
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6. Sexist Culture in Laxman Gaikwad's the Branded

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& Dist- Dhule (Maharashtra).

Preliminaries

The status and position of women all over world is same. They have been oppressed, suppressed, marginalized, exploited, sold, raped, murdered and what not. In the 21st century, though they seem to be free, working in factories and offices, but they are still oppressed and exploited either for this reason or for that reason. In the context of class hierarchy, there is little difference, high class society women are less oppressed and exploited than the downtrodden Dalit women, but oppression and exploitation is there. A Tamil poetess Swarupa Rani rightly records her feelings as a dalit woman in her poem:

If male arrogance at home

Gives a resounding slap on one cheek

Caste dominance outside

Thrashes my other cheek

When I went into the fields to earn money by labor

When the landlord there

Lay in wait

To rob

Me as well as my sweat

I wanted to bury myself in the earth like seed

[Quoted in Lal & Others 2004:101]

The Status of Dalit Women

While reading the Dalit literature, especially, Dalit autobiographies, one definitely realizes the worst condition of Dalit women in their tribes and castes. The intention behind writing this paper is that how the Dalits in India have too created and maintained their own sexist culture as it was created and maintained by Blacks in America through their white masters. Clavin Herton rightly opines:

Just as white people have created and maintained a racist culture, so have (Blacks) men created and maintained a sexist culture. Racist culture teaches all whites to be racist in some manner of the other. In and through an elaborate system of masculine versus feminine gender imperatives sexist culture socializes all men to be sexist. [1990:10].

Sexist Culture in Gaikwad's *The Branded*

While reading Laxman Gaikwad's autobiography *The Branded*, one definitely realizes that almost all the women depicted in the story are highly oppressed and exploited by their own people. It does not mean that they are not exploited by higher class people. Undoubtedly the Police and upper caste people are there, who too exploit them brutally. The great three factors are found—The Panchayat of Uchalya community, the Police department and the Husbands of their own women—who suppressed, oppressed, exploited, humiliated, raped, etc altogether. Throughout the book, almost each and every women minimum for one time is either arrested or beaten by the Police, the Panchayat also plays great role in harassing women under name of purity and Panchayat's self respect. The husbands do not hesitate while beating and suspecting their wives as it is their birth right. The autobiographer Laxman Gaikwad is also no exception to it. But this book also makes clear that the women are themselves both-- the victims and victimizers. It is Gaikwad's one of the sisters-in-law encourages him to beat his wife by saying, "...a wife's place was at her husband's feet, much like the chappal's that's worn on the foot" [2005:140].

Uchalya is a criminal community. The Police always get the chance of arresting and beating the thieves. When the Police come to investigate the crime, they make an excessive use of their power. Gaikwad compares them with the Yama. Gaikwad's mother Dhondabai has always been oppressed, and exploited by her own husband and the Police. Like her husband and Laxman Gaikwad, she never directly involves in stealing operations. But when the Police come to their hut, Gaikwad writes how they beat and molest the women in the hut, including his mother. She has to face such heart-rending situations many times in her life. Her husband named Martand always takes doubts about her. He always angrily tells her that his elder daughter Saru is not his daughter. He beats brutally her for every reason. Gaikwad narrates one incident, "Father took my mother into the hut and forced her to do sit-ups. Then brought her out beating



violently all the while [Ibid: 22]. Such a submissive, tolerant hard working mother of Gaikwad dies in her middle of life in want of medical treatment due to the abject poverty in the house.

Gaikwad's all the sisters-in-law also become the victims of the Police, the Panchayat and their own husbands. Their relative Elava comes to Latur for thieving business, after the theft Elava runs away, but Gaikwad's elder sister-in-law gets arrested by the Police. The police arrested my sister-in-law. My sister-in-law never indulges in thieving, she knew nothing about it... Moreover, they got good things to eat. Hence they allowed these thieves a temporary refuge [Ibid: 125]. The same sister-in-law named Kashibai gets badly insulted by the Panchayat. The whole family comes to Mahalangara to attend a marriage. Thread-winding ceremony at the time of bath to the Bride is in progress. Kashibai begins to wound the thread round the hand, at that time; the villainous Panchayat takes objection that Kashibai's grandmother has run away with Maratha. Thus, the marriage ceremony is stopped. Finally, Gaikwad's father pays twenty-one rupees to the Panchayat as the fine to get purified and to get accepted back into community. Another sister-in-law, while sleeping at night outside the hut, an unknown person comes to her and lay by her side. The stranger with a rough mauling action pressed down my sister-in-law had intercourse with her and run away. Gaikwad has watched the whole drama of rape, but when another sister-in-law asks to her that if he has done anything with her. The raped sister-in-law replies that she does not allow him to sleep with her, but Gaikwad further writes, "She (raped sister-in-law) knew full well what exactly the truth was. She has prevaricated because she was afraid that Bhau, her husband, would divorce her" [Ibid: 86]. It is very pathetic that being raped by the stranger, she even tells that nothing has happened because of the fear of her husband that he can divorce her.

The suppression of the women by the Panchayat has no end. Even the punishment awarded by it, seems to be very surprising and shocking. There is a person named Shankarya. The Panchayat has blamed that he has used his own daughter as his wife. The Panchayat gives shocking verdict on it, moreover as a punishment it was directed that Shankarya's moustache be shaved with the piss of his daughter. At the time of marriage of Kashibai's brother at Salgara, the Panchayat has an objection to the marriage because the girl's mother's mother had lived with a Maratha. So the girl's mother was born of a Maratha father. The Panchayat after much discussion gives punishment:



At last one of the Panchas brought a razor, wetted the woman's (Bride's mother) hair with water and began to shave her head. The woman's heart wept mutely in her agony. The sin of the mother was visited on the Daughter. Even while the husband (her husband) was alive, the Panchas shaved her head clean. Not satisfied with that, the Panchas smeared her head with ochre. The bride's mother had pushed the end of her sari into her mouth, lest her weeping be heard [Ibid: 121].

Gaikwad also expresses his views on the tyranny of the Panchayat. He states: "I found the functioning of the Panchayat obnoxious and disgusting. I was, small fry, however before this gigantic social monster" [Ibid: 120].

Conclusion

The above discussion about the suppression, exploitation, oppression, humiliation of the Uchalya women makes clear that their own sexist culture in the form of monstrous Panchayat and husbands' jungle rule of abusing and beating is responsible for the wailing of their own women. The Police comes to their door-step because also of their criminal deeds. If they cannot stop their pilfering business, never mind, but they can stop their brutality on their own women. that will definitely relieve the Dalit women and they will have only bear the cruelty of the Police. Leela Dube very aptly writes in her research paper, Caste and Women: "Caste is not dead. Gender is a live issue. The principles of caste inform the specific nature of sexual asymmetry in (Hindu) society; the boundaries and hierarchies of caste are articulated by gender" [1996:21].

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Dr. Deepak Chaudhari: An Emerging Creative Writer

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Dr. Deepak Chaudhari is an emerging creative writer in English. It is the great proud for we khandeshis that Dr. S. R. Patil, Dr. Deepak Chaudhari and Dr. Vaibhav Sabnis started to write in English. In fact, it is very difficult to write something even in our mother tongue, but these writers proved that they have sensitive hearts and we listen their delicate and tender heart-beats in their writings. Dr. Chaudhari has published two collection of short stories last year- *A Cow and Other Stories*(2018) and *Karna and Selected Stories* (2018). When we read both the short story collections, we see that the writer has tried to touch almost all the subjects that trouble modern man.

For the paper, I purposefully selected the collection *A Cow and Other Stories*(2018). There are ten short stories in it. Five out of ten stories deal with the changing life style of modern man in the context of technology, human relationships, helpless animals etc. The writer Chaudhari, though new in the field of creative writing, seems to be highly successful in handling all the subjects. While reading the stories, one does not feel that he/she is reading English short-story, and wandering through the lanes of alien cities and villages. On the contrary, he/she feels that the story is happening and growing around him/her. The characters are also so life like that the reader feels that he/she meets them in day to day life. The language used by the writer is also so simple and easy. The most important feature of his writing is that the dialogue between and among the characters, also make a good dialogue with the readers. The dialogue also make a good help to develop the action.

As mentioned earlier, five short stories have been selected for the study- *A Pen Drive, Husband and Wife, A Cow, The Step Mother and The Flat* deal with theme of changing life style of modern man. The opening story *A Pen Drive* focuses on the fact that the modern man is becoming slave of technology. Prof Popte becomes helpless and speechless when he realizes that his lecture saved in a file of pen drive is blocked and lost. "But today, when he (Prof. Popte) started to deliver a lecture for students with Power Point Presentation, he could not present is orally as the file was lost. First three slides displayed on the screen with his name and designation" [2018:19]. In fact, he is an active academician and award winning teacher, but he could not utter a single word without the power print presentation. This story reveals that how a modern man has become a

slave of technology. The same thing happens with us when one sees that his or her mobile is completely discharged and one could not make a call even to his wife because he does not remember the number of his wife's phone, though friend's mobile is available for making a call. In life, one does not bother of mugging of some important phone numbers. He saves the numbers and forgets all. Other stories, *Husband and wife and The Flat*, deal with the same problems. Here modern man's life is totally changed and affected due to the modernity. In Flat culture, modern man closed in the four walls of his house. He or she, though, globally connected through the technology but he or she does not know what is happening in his or her own apartment. Dr. Chaudhari very painfully describes the situation of the death of child. He further notes: "The dead child was a lonely daughter of a software engineer. Her mother was looking at her and father standing nearby folding his hands together... Rapesa looked at the mother of a dead child, she was in a black sleeveless gown in such a elegiac atmosphere" [Ibid: 95]. The writer further compares the situation with the same situation happened in his village. He remembers that the entire village gathered around the house of a dead child. Due to the modernity, one also realizes the changing the relationship of husband and wife. In old days, husband felt insulted if his wife ordered him to do any work of household. The writer Chaudhari very successfully depicts the new picture of husband-wife relationships. Prof. Sinha is married Sheela. He has to help his wife is the housework. Writer very rightly presets: "He (Prof. Sinha) has to listen to her calm and quite whatever she says In these years, he learned to adjust with her. The time has changed. His wife was not going to bear the abusing language as his father behaved with his mother" [Ibid:26]. While reading the stories- *A Cow and The Step Mother* the reader also realizes the modernity has also made a sky change in the life of modern man in the context of animals and the day to day cloths like quilts. In both the stories, the writer Chaudhari succeeds in depicting how a modern man has completely changed his or her attitude towards the dumb animals like cows, dogs, the cloths like quilts and blanket. Remaining five stories of the collection are worth reading and fascinating.

While concluding the paper, I heartily appreciate the attempts of all the three creative writers- Dr. S. R. Patil, Dr. Deepak Chaudhari and Dr. Vaibhav Sabnis. Dr. Deepak



Chaudhari in very early life of his career, has made a great daring of writing short stories in English and fortunately, he became successful in his attempts. I appeal and recommend to our university English Board of studies to prescribe his short stories to the syllabus of under graduate students. I once again express my happiness that we got three great Khankashi writers, writing in English.

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Self Attested
Dr. Deepak

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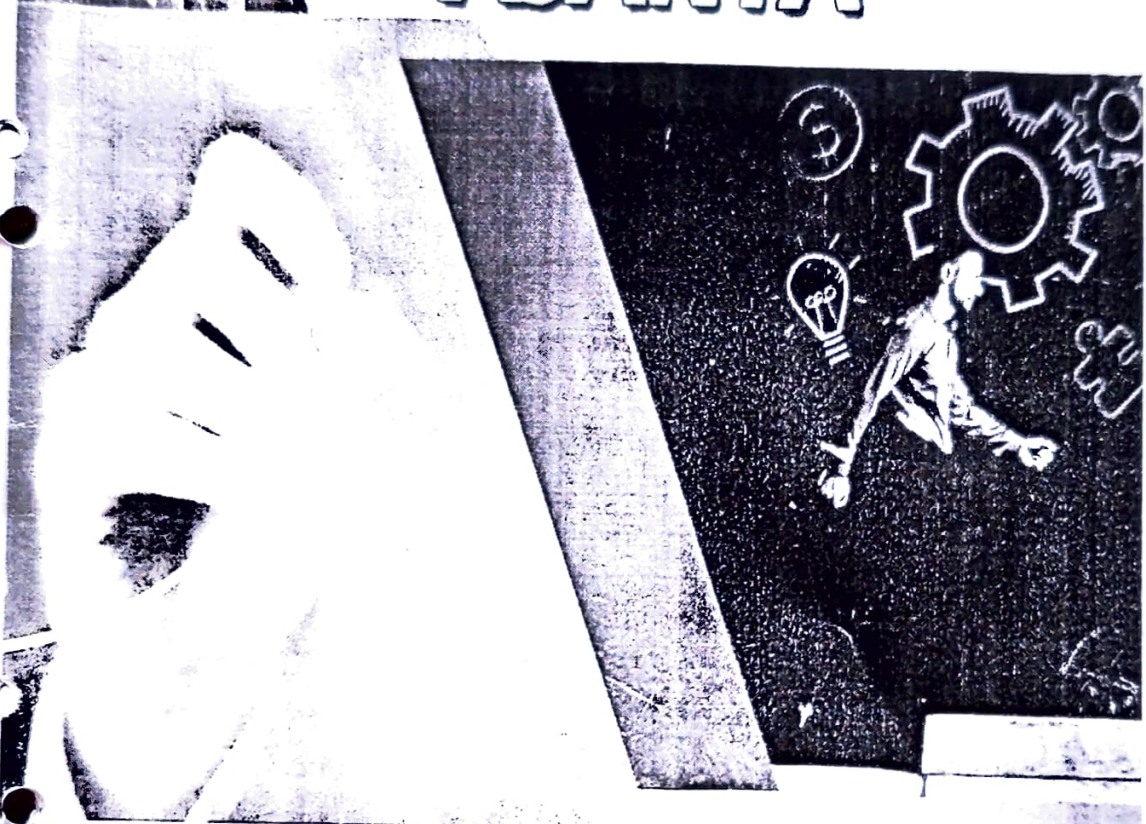
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20. Mythology and Environment: A Perspective Study in Novels of Amish Tripathi

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Abstract

This paper carries out a critical review of the trends of mythology and environment. In ancient mythology, it tells about nature and beauty. It describes about the holy rivers like Saraswati, Ganga, and Yamuna that flow in India. Mythology and Environment have very close relationship between them. Mythology describes importance of rivers and its waters.

The author tells about environmental changes and effect on the people special reference of Saraswati River. Somras is made by its water. Amish Tripathi describes its water is as 'Amrut', which flows from different mountains, hills and places. Many cities and villages situated on the bank of rivers and the people call it as Goddess. When one starts to read the novel, Saraswati seems to be on death bed. In spite of it, the two countries Mehula and Swadweep means Suryavanshi and Chandravanshi battle for it. The battle between them is crucial. Thus, it is the need to save water, environment and our earth.

Introduction

Natural environment has always been depicted since ancient times in various forms of literature, even in religious scriptures are full of such references about natural surroundings. The 'pastoral' form of literature which was initiated in the 3rd century BC by Theocritus of Greece reflected the scene rural life full of simplicity and harmony, this form become very popular as it uplifted the rustic life against the degraded complex life of urban society. Ecocriticism established itself as an independent organization under the name "Association for the study of literature and environment" (ASCE) with its own academic journal. "Inter disciplinary studies in literature and environment" (ISLE) their aim is to create awareness through ecocritical writings, amongst the world community about the concern for environment.

The aim of this paper is to study The Shiva Trilogy by Amish Tripathi. which contains three novels are The Immortals of Meluha, The Secret of the Nagas and The Oath of Vayuputras. These novel deals with Somras and some historical facts of nature.

SOMRAS: Some Historical Facts of Nature

The author is inspired by some thoughts, incidents and stories of past. Banaras (Varanasi), a city situated on the bank of Varuna and Asi. The city has its historical and mythical importance. In the novel,

Bhagirath, with the help of Meluhan engineers, had come up with a brilliant plan. The sides of the Yamuna were dug up and giant sluice gates were built along them. These gates, serving as locks, would be opened slowly to guide the Yamuna onto its new course in a deliberate and controlled manner, over many months. Bhagirath had named these sluice gates the 'Locks of Shiva'. The Yamuna was thus slowly diverted onto its new course, to unite with the Ganga at Prayag. The Lock of Shiva had thereby allowed the Ganga to take its new form, gradually, without the chaos of an uncontrolled flood.

The addition of the massive Yamuna, along with the already worthy presence of the enormous Brahmaputra, had enhanced the mighty Ganga into the biggest river system in India. It also came to be believed that the Yamuna carried the soul of the Saraswati into the Ganga, thus transforming it into the holist river in India. [Tripathi 2013: 557]

Banaras situated on the bank of Ganga is a sacred river but now due to some reasons it has become polluted. The reasons are- 1) Many industrial cities like Kanpur drain industrial waste into it. 2) Wastage and sewage water mix in it.

It becomes very necessary to discuss about Ganga otherwise it will also extinct like Saraswati. So we can say that the novelist is trying to warn us to save Ganga. The author is inspired by Micheal Danino's book 'The Lost River- On the trail of The Saraswati'. He has written a lot on the river Saraswati. Saraswati was the most sacred river of ancient Indian civilization. It was mentioned in almost all ancient texts like the Rig-Veda, Ramayana, and Mahabharat etc. The Saraswati has always been believed to flow over the great gangetic plains and meeting the Ganga and Yamuna at the Sangam (Prayaga). In the novel the flow of River Saraswati covers areas of Gujarat, Rajasthan, Haryana, Panjab, whole of Kashmir and parts of present Pakistan. The whole area was the past of Meluhan Empire. It rises from mount Kailash in mansarovar and flows through the following route-Mount Kailash - Devagiri - Mrttikavati. In





crushed and churned in huge machines with water. The water from the Saraswati is brought to these machines through complex system of canals. The water is collected in enormous pools in cavern which is called Sagar, an ocean. This ocean is very vast and needs much water. The researcher wants to discuss is that Somras on one hand is blessing for many people but at the same time it becomes curse who consume too much. "That the Somras has been the greatest Good of our age is pretty obvious," said Brahaspati. "It has shaped our age. Hence, it is equally obvious that someday, it will become the greatest Evil. The key question is when would the transformation occur". [Tripathi 2013: 11]

The novelist Tripathi also talks about death of Saraswati on the sacredness of this river and also that this holy river was respected in ancient India and that is only we are responsible for the extinction of this river. Even today, we are not taking this problem seriously and if we continue to remain careless we will see the same fate of other rivers also. Therefore Shiva could clearly see the side effects and the ecological destruction caused by the Somras. So bad effects of Somras are - 1) It causes cancer. 2) It causes ecological imbalance. 3) It generates large amounts of toxic waste, which cannot be disposed on land or in sea. 4) It causes plague of Branga. 5) It causes deformities among Nagas. The author has also suggested easy process to explore the toxin.

By consuming Somras Mehulan people live long life. Daksha lived for 184 years old. In fact in Mehulan people do not look old. In the novel, Nandi also lives more than hundred years old. Shiva asks the cause of it. Brahaspati tells how Somras works in the body. When it enters into the body the diseases in the body starts vanishing and cured. When the diseases are completely cured they never occur again and the body remains healthy.

Conclusion

While reading Amish Tripathi trilogy The Shiva Trilogy one realizes the importance of rivers and nature as well. The death of Saraswati, the increasing pollution of Ganga is the example of bad effects on environment. We have already highly polluted the rivers and imbalanced the nature. If we continue with this the day is not long when we will have no good and hygienic place to live.

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४. संत साहित्य आणि पर्यावरण

डॉ. जितेंद्र शामसिंग गिरासे

मराठी विभाग प्रमुख, श्रीमती एन. एन. सी. कला वाणिज्य व विज्ञान महाविद्यालय, कुसुंबा ता.जि. धुळे.

प्रास्ताविक

पर्यावरण संवर्धन त्याचा प्रसार आणि प्रचार ही काळाची गरज झाली आहे. आज पर्यावरण रक्षणासाठी शासन खूप खर्च करित आहे. वेगवेगळ्या योजना राबविण्या जात आहेत. परंतु साहित्याचाही या पर्यावरण रक्षणात व प्रसारणात खूप मोठा वाटा आहे हे आपण लक्षात घेतले पाहिजे. आपल्या मराठी संत परंपरेत संतांनी देखील पर्यावरणाचे महत्त्व आपल्या अभंगातून व साहित्यातून पटवून दिले आहे. त्यात संत तुकाराम, संत ज्ञानेश्वर, संत रामदास, संत तुकडोजी महाराज यांचे खूप मोठे योगदान आहे.

आज जग 21व्या शतकाकडे वाटचाल करित आहे. वेगवेगळ्या चर्चासत्रातून विविध वृत्तपत्र व मासिकातून पर्यावरणाचे महत्त्व व ते टिकविण्यासाठीच्या उपाययोजना त्या संदर्भातील शिबिरे आयोजित केले जात असतात. आजच्या या विज्ञानयुगामध्ये व औद्योगिकरणामुळे कारखान्यांची संख्या खूप वाढली आहे. त्यामुळे पर्यावरण दुषित होत चालले आहे. हिरवी कंच वनराई याचा नाश होत आहे. हरितक्रांतीचे स्वप्न धुळीला जात आहे. ही परिस्थिती आणि त्याचे गांभीर्य पूर्वीच संतांच्या लक्षात आले होते. म्हणून संत तुकाराम महाराज यांनी वेळीच त्याचे महत्त्व जाणुन आपल्या अभंग-ओव्यातून त्याची काळजी घेण्याविषयी सूचित केलेले दिसते. याकडे लक्ष वेधणारा हा शोध या लेखातून घेतला आहे.

पर्यावरण परिरक्षण

आज सामाजिक समरसतेबरोबरच पर्यावरणाच्या परिरक्षणाची जाणीव समाजात दृढ करणे अपरिहार्य होत आहे. यासाठी फक्त कायदे करून चालणार नाही. त्यासाठी समाजमन तयार होणे गरजेचे आहे. पर्यावरण परिरक्षणाची संवेदना निर्माण होणे महत्त्वाचे आहे. सभोवती असलेला निसर्ग, हवा, पाणी, वनस्पती, खनिजे, पशु-पक्षी आदींचा पर्यावरणात समावेश होतो. पर्यावरणाची सुरुवात आपल्या सभोवतीच्या परिसरापासून होऊन त्याची व्याप्ती विराट विश्वापर्यंत आहे. दिव्यचक्षूच्या सिद्धांतानुसार तुकारामांच्या अनुभूतीने विश्व आणि जीवसृष्टीचा संबंध स्वयंभू स्वरूपाचा आहे हे स्पष्ट होत आहे. विश्वातील प्रत्येक जिवाची (मनुष्य प्राणीचीच नव्हे) पंच ज्ञानेंद्रिये आणि पंचकेंद्रिये ही विश्वाच्या पंच महाभूतांमुळे कार्य करण्यास तत्पर आहेत. याचाच अर्थ पर्यावरणाचा, पंचमहाभूतांचा आणि जीवांच्या पंच ज्ञानेंद्रिये आणि पंच कर्मेंद्रियांचा अन्योन्य, परस्परंशी, एकजीव संबंध आहे.

पर्यावरणाविषयी आत्मीयता, प्रेमभावना जागृत होऊन सदैव आपल्या सेवेत असलेल्या पर्यावरणाविषयी परिरक्षणाची व संवर्धनाची जाणीव जागृती निर्माण होते ही संवेदना तुकाराम महाराजांनी अभिव्यक्त केली आहे ते म्हणतात-

''वृक्षवल्ली आम्हा सोयरी वनचरे। पक्षीही मुस्वरे आळविती,

येण सुखे रुचे एकांताचा वास। नाही गुण दोष अंगा वेत॥

आकाश मंडप पृथिवी आसना रमे तेथे मन झीडा करु॥¹

ते म्हणतात, आपल्या भोवती बहरलेली वृक्षवेली सोयरी आहेत, इतस्ततः स्वैर संचार करणारे पशु जीवलग मित्र आहेत. आणि सुस्वर शब्दांनी आळविणारे पक्षिगण आपली करमणूक करीत आहेत. वृक्ष, वेली, पशू, पक्षी यांच्या सहवासात वनराईत सुख आहे आनंद आहे.

सृष्टीविषयी भूतदया

संत तुकारामांनी सृष्टी त्यातील जीवजंतु, साप, प्राणी, वनस्पती यांच्याविषयी कळवळा व्यक्त केला आहे. ते म्हणतात,

॥ मारु नये सर्प संताचिये दृष्टी। होतील ते कष्टी व्यापकपणे॥

एकसूत्र जीवी शिवी ऐक्यता। रोप उपडिता अंग कापे॥² (2889)

ते म्हणतात, सापाला, रोपाला मारु नका त्याची वृद्धी होऊ द्या. त्यास संरक्षण द्या. दया करुणा दाखवा. यातून सृष्टी, प्राण्यांविषयीची भूतदया प्रगट होताना वाचकास लक्षात येते.

संत तुकडोजी महाराजांनी देखील ग्रामजीवनाचे महत्त्व पटवून देत असतांना पर्यावरणाचे त्यांच्या संवर्धनाचेही महत्त्व पटवून दिले आहे. त्यांनी आपली जमीन, पाणी जनावरे, वनस्पती वने आणि नैसर्गिक साधनसंपत्ती यांचे योग्य पद्धतीने नियोजन व पर्यावरण संरक्षण करणे ही काळाची गरज आहे याचे महत्त्व ग्रामीण लोकांना समजून सांगितले आहे. त्यासाठी जलसंधारण, मृदसंधारण, कृषिविकास, पशुसंगोपन, वृक्षलागवड, सामुहिक आरोग्य या घटकांच्या भोवताली वावरताना मनुष्य मात्राने काळजी घ्यावी त्याचे संवर्धन करावे असे त्यांना वाटते. डॉ. सुभाष सावरकर म्हणतात, पाणी ही सर्व चराचर जीवितांची अत्यावश्यक गरज असून मानवाला तर अन्न, वस्त्र, निवारा या मूलभूत गरजांपेक्षाही पाणी हे अधिक महत्त्वाचे आहे. असे विधान संत तुकडोजी महाराज यांनी केले होते. त्यांची आठवण सावरकरांनी प्रस्तुत विधानातून करून दिली आहे. अर्थात पाणी दुर्घीत होऊ नये त्याची शुद्धता टिकून राहावी यासाठी मानवाने त्याचे महत्त्व जाणून घेतले पाहिजे. यासाठी त्यांनी भाषणेही दिली आहेत.

पाण्याची शुद्धता, पर्यावरण व वृक्षारोपण

निसर्ग हा जिवांचा निर्माणकर्ता आणि पोषणकर्ता आहे. पशु-पक्षी, वृक्षवेलीबरोबरच मानवी जीवनाच्या गरजा भागविल्या जात असतात. निसर्ग हा समर्थ आहेच पण मानवाच्या भोगवादी लालसेने त्या निसर्गाचा मनमानी विनाश चालविला आहे. या बाबतीत संत तुकडोजी महाराज यांनी खंत व्यक्त केली आहे. औद्योगिकरण, शहरीकरण, वाढती लोकसंख्या आणि नैसर्गिक साधन संपत्तीचा बेधुंद विनाश याद्वारे पर्यावरणाच्या सुरक्षेला बाधा आली आहे. मानव हा स्वतःबरोबरच संपूर्ण सृष्टीचे अस्तित्व धोक्यात आणिते आहे. पर्यावरण असंतुलानामुळे आज पाऊस अनियमित झाला आहे. वृक्षांच्या सशक्त आच्छादनाअभावी जमिनीत पाणी मुरण्याची-साठवण्याची प्रक्रिया तर खंडित झाली आहेच. शिवाय वृक्षांच्या छात्रीमुळे बहुदिशान् सौम्यपणे भूमीवर गरंगळणाऱ्या पावसाच्या थेंबामुळे मातीची धूप होण्याची क्रिया जी नियंत्रणात होती ती आता जमिनीवर आदळणाऱ्या जोरकस पाऊस थेंबामुळे अनियंत्रितपणे बोकळली असून त्यामुळे अवनत झालेल्या जमिनीचे राज्यातील प्रमाण 42.52 टक्के झाले आहे. ही मौल्यवान जमीन-पाणी तिचे रक्षण करणे ही काळाची



आहे असे संत तुकडोजी महाराज सांगत असतात. या संदर्भात महाराजांची अभंग ओवी समजून घ्यासारखी आहे. ते म्हणतात,

‘मनुष्य ग्रामाचा संरक्षक/ग्राम देशासि पोषक ।

देश विश्वाचा घटक । ऐसे व्हावे यथार्थ॥

मनुष्याचे सर्वस्व ग्राम आहे। त्याविण त्याला अस्तित्व नोहे।

ग्रामसर्वांगपूर्ण राहे। तरीच वैभव मानवाचे॥’

वरील अभंग ओवीतून संत तुकडोजी महाराजांनी मनुष्य हा पर्यावरण व ग्रामाचा संरक्षक कसा असू शकतो, त्याने हे सृष्टीचे वैभव जतन करून ठेवले पाहिजे. तरच त्याचे विश्वात स्वतःचे अस्तित्व भान राहू शकते असे संत तुकडोजी महाराज यांना सूचित करावयाचे आहे.

एकूणच आज संत साहित्य आणि पर्यावरण अभ्यासण्याची गरज तरुण पिढीला आहे. म्हणून हा उपक्रम ज्या पिढीसाठी राबविणे हिताचे आहे हे मला शोधनिबंधातून सूचित करावयाचे आहे. म्हणून मराठी साहित्यात पर्यावरण साहित्य निर्माण होणे ही काळाची गरज आहे असे मला वाटते.

निष्कर्ष

- मराठी संतपरंपरेची संतांनी पर्यावरणाचे महत्त्व विकसित केले आहे.
- पर्यावरणाच्या परिरक्षणाची जाणीव समाजात संतांनी करून दिली आहे.
- संत तुकाराम महाराज यांनी आपल्या अभंगातून पर्यावरणाची महत्ता पटवून दिली आहे.
- संत तुकडोजी महाराज यांनी पर्यावरण रक्षणाशिवाय मानवी अस्तित्व राहू शकत नाही याची जाणीव अधोरेखित केली आहे.
- संतांच्या अभंगातून पर्यावरण रक्षणातून प्राणी मात्रांविषयीची भूतदया अभिव्यक्त होताना दिसते.

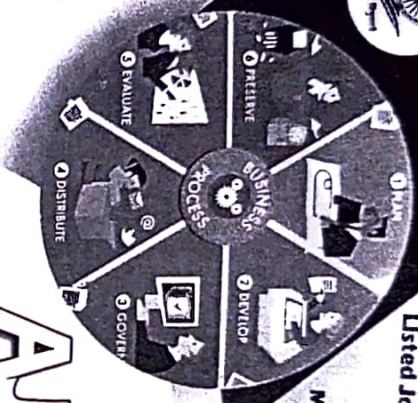
संदर्भ ग्रंथ

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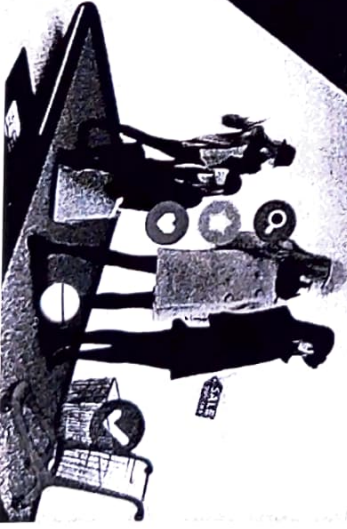
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15. Cartap Hydrochloride and Imidacloprid Efficacy on Food Consumption of Cerastus Moussonianus

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Abstract

These animals are important agricultural and horticultural pests. Besides that they act as intermediate hosts for many trematode parasites. *C. moussonianus* is active in searching the food. LC_{50/5} concentration of 24hrs of Cartap hydrochloride (0.08%) and Imidacloprid (0.10%) were selected to check the effect of Cartap hydrochloride and Imidacloprid on food consumption. Pesticide solutions were prepared in distilled water. Doses were administered to obtain five final concentrations of 0.06, 0.07, 0.08, 0.09 and 0.10 % of Cartap hydrochloride and 0.08, 0.09, 0.10, 0.11 and 0.12 % of Imidacloprid. In a control variant, distilled water without pesticides was used. Food consumption of adult animals was tested. Present study shows that *C. moussonianus* feeds on the leaves of Aloe vera in different quantity as per the effect of pesticides.

In comparison with control 100% feeding on Aloe vera treated with Cartap hydrochloride, the food consumption was decreased in the snail by 57.57, 39.47, 25.66, 16.12 and 6.25% as per the concentration increases 0.06, 0.07, 0.08, 0.09 and 0.10% respectively and with Imidacloprid the food consumption was decreased in the snail by 62.83, 48.03, 36.84, 18.75 and 14.8% as per the concentration increases 0.08, 0.09, 0.10, 0.11 and 0.12% respectively.

Keywords:- Cartap Hydrochloride, Imidacloprid, *Cerastus moussonianus*, food consumption, etc.



Introduction

Molluscs are second only to arthropods in numbers of living animal species far behind the arthropods 1,1,13,000 but well ahead of chordates were 52,000. It has been estimated that there are about 200,000 living species in total and 70,000 extinct species.

Species like *Bellamya bengalensis*, *Pila globosa* and *Lamellidens marginalis* are proven food for many aquatic animals and man; some such as *Lamellidens marginalis* and *Lamellidens corrianus* have also been used to produce pearls in some parts of India (Subba Rao and Dey, 1989). *Achatina fulica* may be of economic importance as a medicinal and nutritional (protein) source (Muniappan, 1990 and Santos Carvalho et al., 2003), but remains a serious agriculture pest throughout the Indo-Pacific Islands (Raut, 1982). Snails can also hide beneath soft soil (Shah, 1992). "Introduction of an exotic can lead to casts to nature; that is loss of native populations and communities impacted by the invader; but measuring the economic value of a population of a rare species that is not used by humans is difficult (Civeyrel and Simberloff, 1996). *Achatina fulica* has been introduced in Brazil as an alternative for *Helix aspersa* at "mollusks farms" providing the escargot for traditional French cuisine (Teles, et al., 1997).

The snail presents possible public health hazards with regards to the spread of diseases such as angiostrongylosis and eosinophilic meningoencephalitis due to its important role as a host in the life cycle of *Angiostrongylus cantonensis* (CAB, 2003 and Santos Carvalho, et al., 2003).

Three species of *Cerastus* are abundantly available in India, the *Cerastus moussonianus* being abundantly available in Marathwada region besides, *Cerastus malabaricus* and *Cerastus jerdoni* (Satyamurti, 1960).

The snails are the most successful animals as far as their adaptability are concerned. These animals are important agricultural and horticultural pests. Besides that they act as intermediate hosts for many trematode parasites. As there is little information available regarding most common and abundantly available snails, one of the pulmonate terrestrial snail *Cerastus moussonianus* is selected as a model in order to understand its biological and physiological aspects.

Material and Methods

C. moussonianus is active in searching the food. $LC_{50/5}$ concentration of 24hrs of Cartap hydrochloride (0.08%) and Imidacloprid (0.10%) were selected to check the effect of Cartap



hydrochloride and Imidacloprid on food consumption. Pesticide solutions were prepared in distilled water. Doses were administered to obtain five final concentrations of 0.06, 0.07, 0.08, 0.09 and 0.10 % of Cartap hydrochloride and 0.08, 0.09, 0.10, 0.11 and 0.12 % of Imidacloprid. In a control variant, distilled water without pesticides was used. Food consumption of adult animals was tested. The shell diameter of mature individuals used in the bioassay ranged between 1.8cm and 2cm. 110 individuals of adult age category were used for Cartap hydrochloride and Imidacloprid concentrations along with control. The experimental animals, divided into 2 groups of 5 sets (each of 10 animals), were offered to food contaminated with the pesticide solutions. Additional batch of 10 snails was used in the negative control variant. Leaves of Aloe vera were used as food in the experiment.

Scientists have discovered over 150 nutritional ingredients in Aloe vera. There seems to be no single magic ingredient. They all work together in a synergistic way to create healing and health giving benefits. The eleven main areas of chemical constituents of Aloe vera include: amino acids, anthraquinones, enzymes, minerals, vitamins, lignins, monosaccharide, polysaccharides, salicylic acid, saponins, and sterols. Leaf cut samples of 5g were used for each repetition. The leaf samples were sprayed by the test solutions and placed into the rearing beakers with the experimental animals. The experiment was carried out in a beaker at Room temperature 85% RH and 10/14 h (L/D) for 7 days. Snails were starved for 24hrs before experiment. To determine daily food consumption, after every 24hrs, the remains of food were removed from rearing beakers and fresh food (5g), treated with the pesticide solutions as mentioned above, was added to the beakers. Each day, fresh pesticide solutions were mixed and used for a food treatment. Weight of the food remains was measured to determine daily food consumption of tested animals.

Gastropods not only possess a precise mechanism for locating foods by chemical cues but they also are able to discriminate between foods or potential foods using taste and smell. It has long been known that gastropods have a selective diet.

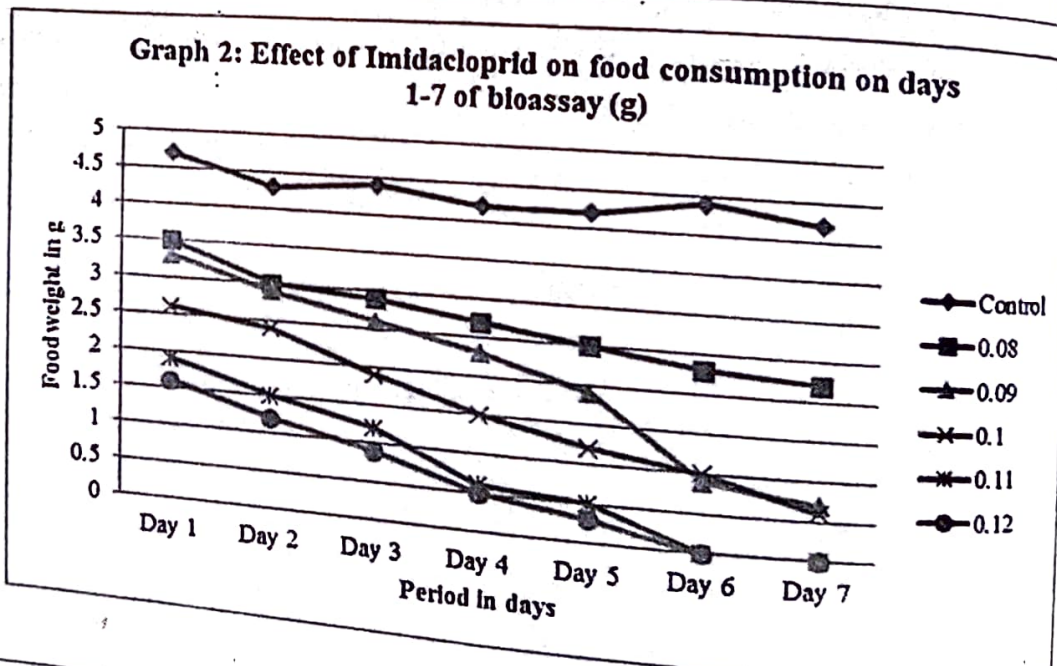
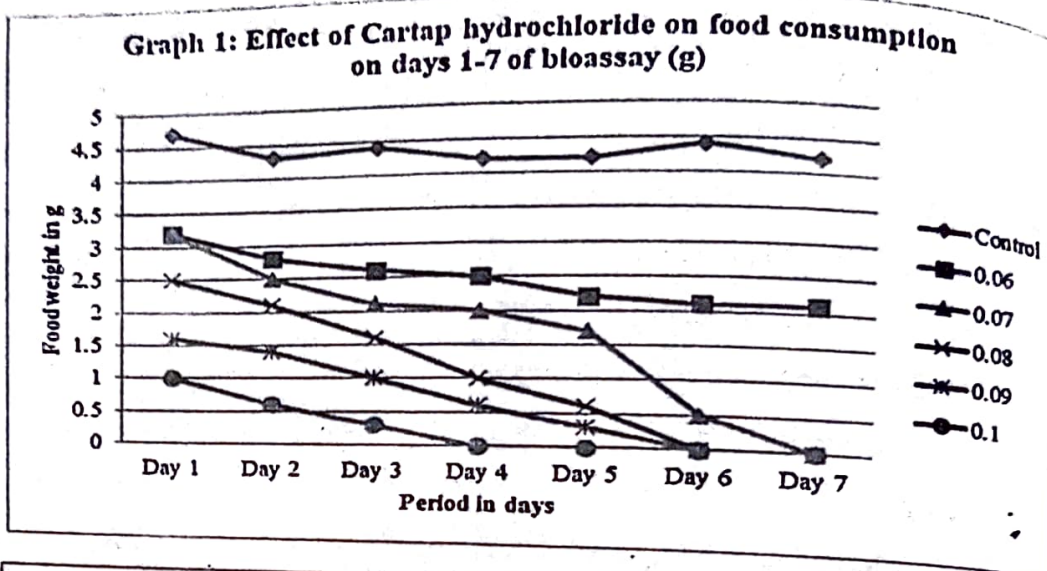
Result

Present study shows that *C. moussonianus* feeds on the leaves of Aloe vera in different quantity as per the effect of pesticides.

In comparison with control 100% feeding on Aloe vera treated with Cartap hydrochloride, the food consumption was decreased in the snail by 57.57, 39.47, 25.66, 16.12 and 6.25% as per the



concentration increases 0.06, 0.07, 0.08, 0.09 and 0.10% (Graph 1) respectively and with Imidacloprid the food consumption was decreased in the snail by 62.83, 48.03, 36.84, 18.75 and 14.8% as per the concentration increases 0.08, 0.09, 0.10, 0.11 and 0.12% respectively (Graph 2) (Table 1).



Food treated with	Concentrations (In %)	Mean weight of food consumed from days 1-7 of bioassay (g)							% food Consumption
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
Cartap	Control	4.7	4.3	4.4	4.2	4.2	4.4	4.2	100
	0.06	3.2	2.8	2.6	2.5	2.2	2.1	2.1	57.57
	0.07	3.2	2.5	2.1	2.0	1.7	0.5	0.0	39.47
	0.08	3.2	2.5	2.1	2.0	1.7	0.5	0.0	39.47



hydrochloride	0.08	2.5	2.1	1.6	1.0	0.6	00	00	25.66
	0.09	1.6	1.4	1.0	0.6	0.3	00	00	16.12
	0.10	1	0.6	0.3	00	00	00	00	6.25
Imidacloprid	0.08	3.5	3.0	2.9	2.7	2.5	2.3	2.2	62.83
	0.09	3.3	2.9	2.6	2.3	1.9	0.9	0.7	48.03
	0.10	2.6	2.4	1.9	1.5	1.2	1.0	0.6	36.84
	0.11	1.9	1.5	1.2	0.6	0.5	00	00	18.75
	0.12	1.6	1.2	0.9	0.5	0.3	00	00	14.8

Table 1: Effect of Cartap Hydrochloride and Imidacloprid on the Food Consumption of the Snail *C. Moussonianus*

Discussion

Hodasi (1982) reported that perpetual light (both day and night) promoted rapid growth as continuous light at night have activatory effect on the snails, thus increasing their activity and rate of food consumption. *P. canaliculata* are extremely polyphagous snails, feeding on vegetal, detrital and animal matter and they also show quite flexible methods of food acquisition (Cazzaniga and Estebenet, 1984). Shoaib, et al., 2010 observed the effect of Nimbecidine® on food consumption of *Monacha obstructa*. Nimbecidine® caused reduction in the food consumption of immature and adult snails compared with untreated control variants. It was observed that the repellent activity of Nimbecidine® was dose dependent. At the highest concentration (10 ml/l), the adult and immature snails avoided contacting with food completely. The lower concentrations affected the food consumption of tested animals. The food consumption was significantly higher ($p < 0.05$) in the control variants than in all of the treatments with Nimbecidine® for both age categories of snails. Correlation between Nimbecidine® concentration and the food consumption on the First day of bioassay was significant ($r = -0.74$, Pearson correlation analysis, $p < 0.05$) for the adult stage. At concentrations of 2.5 and 5 ml/l, the adult and immature snails did not consume any lettuce on the second day of experiment. At the lowest concentration tested (1.25 ml/l), the adult and immature snails continued in food consumption till the end of the experiment; however, the food intake was significantly reduced in comparison with the control, on average, by 33.78–88.44% ($p < 0.05$) and 94.45–100% ($p < 0.05$) for adult and immature snails, respectively. The food intake of immature individuals was significantly ($F_{4,74} = 47.34$, $p < 0.05$) more affected by the Nimbecidine® treatment (at 1.25 ml/l) than that of adults. On average, the food consumption of immature individuals was affected more than that of adults by 37.54%. Food consumption in the

control variant was not significantly different between immature and adult snails ($F_{4,74}=0.03$, $p=0.05$). The high cost and scarcity of some feed ingredients have been the most limiting factors for commercial livestock production in Nigeria coupled with man-animal competition for grains like maize. Formulated diet can be given to snails to enhance growth and laying performance but the cost of production of the feed is quite high because of more costly of feed ingredients such as maize, wheat offal and corn-bran which are sources of energy, in order to reduce the cost of the feed, there is need to look for alternative sources which are affordable and available (Omole, et al., 2011).

The present study is in agreement with the Cazzaniga and Estebenet, 1984; Shoaib, et al., 2010 and Omole, et al., 2011 and shows the same type of decrease in food consumption. In comparison with control 100%, Cartap hydrochloride shows the decrease in food consumption in the snail by 57.57, 39.47, 25.66, 16.12 and 6.25% as per the concentration increases 0.06, 0.07, 0.08, 0.09 and 0.10% respectively and with Imidacloprid the food consumption was decreased in the snail by 62.83, 48.03, 36.84, 18.75 and 14.8% as per the concentration increases 0.08, 0.09, 0.10, 0.11 and 0.12% respectively.

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The Checklist of Euglenophyceae from Akkalpada Dam, Dhule (Maharashtra)

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Abstract

The present study with relation to diversity of Euglenophyceae class of algae from Akkalpada dam of Dhule district. The study consist Euglenoids flora of different four stations of dam. It shows 05 genera and 15 species belonging to class Euglenophyceae. The morphological types observed are long, elongated, ellipsoidal, cylindrical, ovoid, broad with posterior and anterior end. Flagellated, centrally or posteriorly located nucleus. Chromatophore may plate like, discoid, ovoid. Pyrenoid may present or absent etc. Genera *Euglena* and *Phacus* were encountered by maximum number of species.

Key words: Algae, Diversity, Euglenophyceae.

Introduction

Study of Euglenophyceae flora from Akkalpada dam is need to explain mainly with the relationship between algae and environment. Euglenoids widely spread in aquatic environment and water plays an important role in their growth. Study of Euglenophyceae flora of dams of North Maharashtra region has not sufficient. More (1997)² has made limnological observations of Panzara Dam and river with relation to algae. He reported 04 genera and 19 taxa from dam and river sites. Genera *Euglena*, *Phacus* encountered by maximum number of species. Pendase *et al.* (2000) carried out hydrobiological study of percolation tank of village Dasane of Nashik district. Nandan and Mahajan (2002) made observation of periphyton in Hartala lake of Jalgaon district (Maharashtra). Nandan and Jain (2002) studied algae from Sonvad Dam of Dhule. They found population of Blue green and Green algae were greater than Distoms and Euglenoids. Aher (2003) did limnological studies on Haranbari dam and Mosamriver with reference to algae. He reported 161 algal taxa from Dam site and 198 taxa from river site. Jayabhaye *et al.* (2007) did the study of phytoplankton diversity of Parola Dam, Hingoli. Wagh (2009)⁶ did the study of phycodiversity and water quality assessment of water reservoirs from Ahmadnagar district of Maharashtra state. He reported 02 genera and 03 taxa from dam sites. Euglenoids do not show continuous periodicity. High composition of Euglenoids noted during summer. Patil (2013)⁵ did limnology and biodiversity studies of algal flora of Sulwade Barrage of Dhule District. She reported 05 genera and 14 taxa from dam sites. Genera *Euglena* encountered by maximum number of species. So it is important to study the Euglenophyceae potential from Akkalpada Dam of Dhule.

Materials and Methods

Present study area situated in western khandesh in Dhule district of North Maharashtra. Geographically it lies between 25°56'28" North Latitude and 74°27'22" East longitude. Algal samples were collected from study area at monthly interval for two years Algal samples were collect in plastic bottles containing 4% formalin for further investigation. Algal analysis made by qualitative analysis. With the help of standard monographs and related literatures algae were indentified.



Results and Discussion

In present investigation 05 genera and 15 species are recorded. The maximum population of Euglenoids was observed in July than April. There is seasonal change occurs in population of Euglenoids are never in abundance. In present study *Euglena* and *Phacus* are dominant as compare to other. Maximum composition of Euglenophyceae was reported during summer period. Euglenophyceae represent with following potential as.

01. *Euglenaagilis* Carter
02. *Euglenacaudata* Haben.
03. *Euglenaflava* Dang.
04. *Euglena haematodes* (Ehr.) Lemm.
05. *Euglena heimii* Leferve.
06. *Euglenasucculiformis* Schiller.
07. *Euglenatexta* (Duj). Hubn.
08. *Phacusacuminates* Stokes.
09. *Phacusarnoldi* Swir.
10. *Phacuscuvicauda* Swirenko
11. *Phacusoscillanus* Klebs.
12. *Phacupleuronectus* (O.F.Muller.) Dhujardin.
13. *Trachelomonasgranulosa* Swir. emend Dalf.
14. *Trachelomonasvolvocina* Ehrenb.
15. *Petalomonasprototheca* Skuja.

The total population of Euglenoids are very less. The maximum population of Euglenineae is in June (More, 1997)³. Euglenoids do not show continuous periodicity. High composition of Euglenoids noted during summer (Wagh, 2009)⁶. Similarly, Euglenophyceae it was maximum during summer at north site and during monsoon at south site (Shinde et al., 2012)⁷. Euglenophycian indices showed oligotrophic nature of water (Patil, 2013). In the present investigation, maximum population of Euglenoids were recorded during late summer. A water reservoir having low level of nutrients hence, it supports only few aquatic plants.

A total number 15 species of Euglenophyceae were recorded in Akkalpada Dam. *Euglena* were represented by 07 species, *Phacus* were represented by 05 species, *Trachelomonas* were represented by 02 species and 01 species of *Petalomonas*.

Conclusion

The present study of Euglenophyceae of Akkalpada dam is necessary to assess water resource quality. The outcome results will be helpful to ecologist, taxonomist and scientist. This study also helpful to the researchers of this field.

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EHTNOBOTANICAL USES OF PLANTS FOR TREATMENT OF COUGH AND COLD: A REVIEW

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Abstract

Cough and cold are very common disease. Every year human suffering from the cough and cold two to five times in a year. It is an essential protective and defensive act whose action secures the removal of mucus, noxious, substances and infections from the larynx, trachea and larger bronchi (Kian et al, 2003). This is caused by viruses, common symptoms of cold are fever, cough, rhinorrhea, nasal congestion, sore throat, headache etc. (Julia et al, 2012) For present study various articles on ethnobotany, ehtnomedicinal plants, traditional uses of plants etc. were searched in combinations with word cough and cold. In the present review, it is clear that 80 plants are traditionally used for treatment of cough and cold.

Key words: Ethnobotany, cough, cold, review

Introduction

Cough and cold are very common disease. Every year human suffering from the cough and cold two to five times in a year. It is an essential protective and defensive act whose action secures the removal of mucus, noxious, substances and infections from the larynx, trachea and larger bronchi (Kian *et al*, 2003). It is caused by viruses and are rarely serious. The complications of the cold can be includes chest infections, pneumonia, or ear infections, but this may be rare (NHS). It shows the symptoms like Cough, sore throat, blocked nose, mild temperature, runny nose, headache, sneezing aches and pain etc. Cough and cold is caused by many bacteria and viruses and through them this is spread to new hosts. In developing countries, the traditional methods of medicine i.e. use of medicinal plants plays a vital role for the basic health needs (NAA *et al* 2001). The knowledge of traditional medicinal system plays an important role in the villages as well as in the tribal areas. By the use of this knowledge they cure their most of the diseases. According the world health organization (WHO) near about 65% population of the world is depend on the plants for their need of primary health care (Rajesh kumar, 2015). Taken this view in the consideration attempts were made to find out the medicinal plants who cure cough and cold.

The present study was undertaken to find out the natural remedies or medicinal plants used in the treatment of cough and cold. For the present review the information regarding medicinal plants was gathered via various sources like books, scientific research papers on ethnobotany and ethnomedicine, traditional uses of medicinal plants, various research journals etc. The outcome of the study is summarized in Table No. 1, which shows names of plants, family,, vernacular names, plant part used, mode of use and reference.

Result and discussion:

Ethnobotany deals the relationship in between human and plants. According to published research papers it is observed that 80 plants belong to 45 families were used human for the treatment of cough and cold. Leaf materials were the most used medicinal plant part followed by roots. From the present study it is clear that



family Lamiaceae is dominant over all the families followed by Solanaceae, and Poaceae. Preparations were used orally in the form of extract. Sometimes they were taken in combinations with other plant parts

Table No. 1: plants used for the treatment of Cough and cold

Sr. no.	Name of plant	Family	Vernacular names	Plant part used	Mode of use	Ref.
1	<i>Abrus Precatorius</i> (L.)	Fabaceae	Gunja	Leaves seeds	Leaves and seeds are used	16
2	<i>Abrus precatorius</i> L.	Fabaceae	Gunja	Root & Leaves	Decoction of roots and leaves taken	2
3	<i>Achyranthes aspera</i> L.	Amaranthaceae	Aghada	Whole plant	Whole plant crushed, smashed in water and half cup taken	9
4	<i>Achyranthes aspera</i> L.	Amaranthaceae	Aghada	Flowers	Flowers used for cough	10
	<i>Adathoda vasiva</i> (L.)	Acanthaceae	Adulsa	Leaves	Leaves decoction is taken	3
6	<i>Aerva lanata</i> (L.) Juss. Ex Schultes	Amaranthaceae	Kapurmadhuri	whole plant	Extract of whole plant in water taken orally	2
7	<i>Albizia amara</i> (Roxb.) Bon.	Mimosaceae	Lallei	Leaves	Leaf decoction is used	1
8	<i>Alliums sativum</i> L.	Liliaceae	Lasun	Bulb	Put 3 flakes in boiled water, take twice a day	4
9	<i>Aloe vera</i> (L.) Burm.f.	Liliaceae	Korphad	Leaf	Pulp of leaf juice wrapped in a betel leaf, warmed, cut in small pieces and consumed	11
10	<i>Alysicarpus vaginalis</i> (Linn.) DC.	Fabaceae	Bhuilepto	Root	Root decoction is given	5
11	<i>Amberboa divaricata</i> Kuntz	Asteraceae	Urkuda	Root	Root juice is used	5
12	<i>Anisochilus cornosus</i> (L.) Wall.	Lamiaceae	Jirmya	Root	Root pieces is chewed and eaten	9
13	<i>Anogeissus latifolia</i> Bedd.	Combretaceae	Dhavda	Stem, bark	Bark extract is taken	3
14	<i>Argimone Mexicana</i> L.	Papavaraceae	Bilayati, piwala dhotra	Leaves	The decoction of leaf taken orally	10
15	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Neem	Leaves	Paste of leaves crushed and soaked in water is applied on body parts at night	14
16	<i>Azima tetraacantha</i> Lam.	Salvadoraceae	Needle bush, sukkaa paatha	Root	Root extract with water taken	2
17	<i>Balanities aegyptiaca</i> (L.) Del.	Balanitaceae	Hingbet	Fruit	Fruit powder is taken twice a day	9
18	<i>Bambusa vulgaris</i> Schrad. ex J.C.Wendl.	Poaceae	Bamboo	Root, Bark young shoot	Root, bark and young shoot are used	16
19	<i>Biswellia serrata</i> Toxber. Ex. Colebr	Burseraceae	Salai	Bark	The bark used for cough	10
20	<i>Boswellia serrata</i> Roxb. Ex. Colebr.	Burseraceae	Salai	Bark	Bark powder with honey	6
21	<i>Buchanania latifolia</i> Roxb.	Anacardiaceae	Char, Cheronjee	Fruit	Fruits are used in treating cough	10



22	<i>Caesalpinia bonduc</i> (L.) Roxb.	Caesalpiniaceae	Katekaranj	Bark	Bark is used for treating cough	10
23	<i>Calotropis gigantea</i> (L.)	Asclepiadaceae	Rui	Root, leaves	Roots and leaves are used	16
24	<i>Calotropis procera</i> R.Br.	Asclepiadaceae	Rui	Latex	Latex is used	1
25	<i>Canna indica</i> L.	Cannaceae	Kardal	Rhizome	Rhizome with leaves of <i>solanum trilobatum</i> are boiled with water and decoction taken	2
26	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Kanphuti	Leaf and root	Decoction of leaf and root taken	2
27	<i>Careya arborea</i> Roxb.	Lecythidaceae	Kumbbha	Fruit	Fruits are used in the treatment	10
28	<i>Cassia fistula</i> L.	Caesalpiniaceae	Bahava	Leaves	Leaves are used in cough	10
29	<i>Citrus aurantifolia</i> (Christm) Sw.	Rutaceae	Nimbu	Fruit	Two drops of fruit in black tea & take twice a day	4
30	<i>Cocculus hirsutus</i> (L.) Diels	Menispermaceae	Wasanwel	Root	Root extract is used	1
31	<i>Corallocarpus epigaeus</i> (Rottl. Ex Willd)	Cucurbitaceae	Kadavinai	Tuber	Tuber is used	1
32	<i>Cordial dichotoma</i> Forst.	Boraginaceae	Gondhen	Fruit	Fruit pulp is used for cough	10
33	<i>Cymbopogon citrates</i> (DC.) Stapf.	Poaceae	Gavati Chaha	Leaves	Decoction of leaves is taken twice a day.	9
34	<i>Cyperus rotundus</i> Linn.	Cypraceae	Lavhala	Tuber	Mix fine powder of tuber with honey equally made a 'chatan'	11
35	<i>Dendrocalamus strictus</i> (Roxb.) Nees.	Poaceae	Kalak, velu	Leaf	Leaf infusion with small amount of turmeric powder is given once a day	9
36	<i>Diplocyclos palmatus</i> (L.) Jeffr.	Cucurbitaceae	Kavdoli	Seeds	Seed powder are mixed in water and half cup is taken	9
37	<i>Diplocyclos palmatus</i> (L.) Jeffrey.	Cucurbitaceae	Shivlingi	Whole plant	Decoction of whole plant used	10
38	<i>Dolichus trilobus</i> L.	Fabaceae	Jangli wal	Seed	Seeds powder is taken with a cup of water. The paste is also applied on forehead.	14
39	<i>Eclipta prostrate</i> L.	Asteraceae	Thiki fuli	Leaf	Leaves are chewed and swallowed twice a day	9
40	<i>Eucalyptus globules</i> Labill.	Myrtaceae	Nilgiri	Leaf	Leaf decoction taken orally	2
41	<i>Euphrasia hirta</i> L.	Euphorbiaceae	Dudhi	Leaf	Leaf decoction taken orally	2
42	<i>Evolvulus alsinoides</i> L.	Convolvulaceae	Vishnukranta	Leaf	Leaf decoction taken orally	2
43	<i>Ferula asafetida</i> L.	Apiaceae	Hing	Latex gum	Asafetida is used for cough	10
45	<i>Ficus glomerata</i> Roxb.	Moraceae	Cluster fig, Umbar	Root, leaves latex fruit	Roots, leaves latex, ripe and unripe fruit are used	16



46	<i>Justice adhatoda</i> Medikus.	Acanthaceae	Adulsa	Leaf	Decoction of leaf along with ginger and water taken	2
47	<i>Justicia gendarussa</i> Burn.	Acanthaceae	Kala adulsa	Leaf	Leaves are boiled with water and vapor is inhaled	2
48	<i>Leucas aspera</i> (Willd.) Link.	Lamiaceae	Tamba	Leaves	Extract of leaves taken	1
49	<i>Madhuka indica</i> J.F.Gmel	Sapotaceae	Mohu	Fruit seeds, flower	Fruit, seeds and flower digestion	3
50	<i>Mimosa pudica</i> L.	Mimosaceae	Lajalu	Roots	Roots are used	10
51	<i>Mollugo cerviana</i> L. Ser.	Molluginaceae	Pada	Whole plant	Whole plant boiled with equal amount of <i>Ocimum santum</i> and <i>Leucus aspera</i> in water. This decoction taken for cough	2
52	<i>Mollugo nudicaulis</i> Lam.	Molluginaceae	Naked stem	leaves	Leaf extract is used	1
53	<i>Morus alba</i> L.	Moraceae	Saitush	Stem, bark	Bark extract is taken	3
54	<i>Nyctanthes arbor-tristis</i> L.	Oleaceae	Parijatak	Leaf	Prepare decoction of leaf with sugar and water	4
55	<i>Ocimum americanum</i> Linn.	Lamiaceae	Rantulas	Leaves	Decoction of fresh leaves and taken orally	11
56	<i>Ocimum santum</i> L.	Lamiaceae	Tulsi	Root, leaves, seeds	Decoction of root leaves seeds are used	16
57	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Tulas	Leaf	Prepare extract with leaf, 2 pepper, 1 inch zinger in 1 glass water	4
58	<i>Opuntia dillenii</i> Haw.	Cactaceae	Nagfan	Whole plant	Whole plant used	1
59	<i>Pavonia odorata</i> Willd.	Malvaceae	Sugandhbala	Root	The root boiled and the decoction is taken orally	2
60	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Amla	Fruits	Fruits are used	1
61	<i>Piper nigrum</i> L.	Piparaceae	Kalimiri	Seeds	Put 2 pepper corns in a leaf & Swallow the juice	4
62	<i>Pongamia pinnata</i> L.	Papilionaceae	Karanj	Leaves	Leaves decoction is used	10
63	<i>Semecarpus anacardium</i> L.	Anacardiaceae	Bibba	Roots, leaves seeds	Roots leaves and seeds are used	16
64	<i>Sida acuta</i> Brum.F.	Malvaceae	Chikna	Roots	Root infusion is used	3
65	<i>Solanum nigrum</i> L.	Solanaceae	Laghukavali	Fruit	Fruits are used	3
66	<i>Solanum trilobatum</i> L.	Solanaceae	Bhuiringnee	Leaf	Decoction of leaves in water taken orally	2
67	<i>Solanum virginianum</i> Linn.	Solanaceae	Kate ringani	Seeds	Mix seed powder and honey in the proportion of 1:2	11
68	<i>Sonchus asper</i> (L.) Hill	Asteraceae	Ringni	Leaves	Leaf juice is used	3
69	<i>Spilanthes calva</i> DC.	Asteraceae	Akkalkara	Inflorescence	Inflorescence crushed and mixed in a spoon with honey	14



70	<i>Strychnos poatatorum</i>	Loganiaceae	Kavi	Seeds	Seeds are used	3
71	<i>Tactaria macrodonta</i> C. Chr.	Tectariaceae	Fern	Whole plant	Plant powder is taken once a day	9
72	<i>Tephrosia purpurea</i> (L.) pers.	Fabaceae	Unhali	Roots	Root are used in cough	10
73	<i>Terminalia bellerica</i> Roxb.	Combretaceae	Behada	Fruit	Fruits powder mixed with honey	3
74	<i>Terminalia chebula</i> Retz.	Combretaceae	Hirda	Fruit	Fruits are used	3
75	<i>Thevetia nerifolia</i> Juss.	Apocynaceae	Pivali kanher	Leaves	Leaves decoction is used	1
76	<i>Tinospora cordifolia</i> (Thunb.) Miers	Menispermaceae	Gulvel	Stem, leaves	Stem and leaves are used	16
77	<i>Trichodesma indicum</i> (L.) Lehm.	Boraginaceae	Chota kalpa	Whole plant	Decoction of whole plant taken orally	2
78	<i>Vitex negundo</i> L.	Verbenaceae	Nirgundi	Leaf	Leaves boiled in water and vapor is inhaled	2
79	<i>Withania somnifera</i> (L.)	Solanaceae	Ashwaganda	Root	Root decoction is used	3
80	<i>Ziziphus rugosa</i> Lamk.	Rhamnaceae	Ghatbor	Fruit	Unripe fruits are eaten	5

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ETHNOBOTANICAL USES OF PLANTS FOR SCABIES FROM FOREST AREA OF NAVAPUR TALUKA, NANDURBAR DISTRICT, MAHARASHTRA

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Abstract

The flora of this region is highly diversified in vegetation, rich in floristic composition and contains considerable number of economically important species. The aborigines viz. Kokani, Bhills, Mawachi, Pardhi, Pawara, Vasave etc. inhabit the northern hilly part of the region. These communities of tribal are poor and unable to afford the expenses of modern medicinal treatment. They have the indigenous knowledge of medicinal plants, therefore they depend on the traditional medicines. They use various plant parts or entire plant for scabies the present study deals with medicinally important plants for the treatment of scabies.

Key words: Ethno botanical, Scabies, Forest, Navapur, Nandurbar District.

Introduction

The plants have been used both in prevention and cure of various diseases of humans and their pets. Many system of therapy have been developed primarily based on plants. The world health organization (WHO 1978) reported that 80% of the world's population depends upon traditional medicines. The tribal and certain local communities of this region are poor and unable to afford the expenses of modern medical treatment therefore they depend on traditional medicines. They practice herbal medicines to cure various diseases and disorders. They collect and preserve locally available wild and cultivated plant species. Ethno botany is a multidisciplinary science defined as the interaction between plants and human culture is not limited to the use of plants for food, clothing and shelter but also includes their use for religious ceremonies, ornamentations and health care (Schulter, 1992; Bhamare, 2005).

The objective of the study was to assess the richness of ethno-medicinal plant species used by tribal of forest area of Navapur taluka and the traditional medical practice of the people. The authors tapped the first hand ethno medicinal information from Bhagat, Buwas (Witch Doctors), Medicine men (Vaidu) and tribal old ladies. Medicinal plants used for various ailments are reported throughout India. Memon (1919) on influenza, Biswas (1956) on skin disease, Lal and Lata (1980) on fertility, Bhamare (1998) on skin diseases, Garud, Yadav and Borale (2009) on snake bite, Garud (2009) on stomach pain. The present paper deals with the information of 28 medicinally important plants used on skin diseases (Scabies) and it has been tabularized in table. It includes alphabetically arranged Botanical names, Local names, Family, Habit, Parts used and treatment.

Material and Methods

The present study is the outcome of critical field survey in the different parts, different types of habitat of forest area of Navapur taluka, Nandurbar District. The information was collected from elderly persons, tribal peoples, local medicine men called vaidu etc. all the specimen were deposited in the herbarium of

several places have been visited and information were collected of the medicinal plants which are used to cure the skin disease (Scabies)

Table 1

Sr no	Botanical name	Local name	Family	Habit	Part used	Treatment
1	<i>Achyranthes aspera</i> L.var argentea	Aghada	Amaranthaceae	Herb	Root	Root extract is applied externally
2	<i>Amorphophallus commutatus</i> (Schott) Engl	Mogri kand, Jangli -suran	Araceae	Herb	Tuber	Tuber paste is applied externally
3	<i>Argemone Mexicana</i> L.	PiwalaDhotra, Bilaychi	Papaveraceae	Herb	Latex	Latex is mixed an equal quantity of coconut oil and applied externally
4	<i>Arisaema murrayi</i> (Grah) Hook	Chandya kand, Nagphani	Araceae	Herb	Tuber	Tuber paste is applied externally
5	<i>Azadirachta indica</i> A. Juss	Nimb, Kadunimb	Meliaceae	Tree	Leaves	Leaf pulp applied externally or leaves are kept in hot water for few hours then employed for bath for 7 days
6	<i>Baliospermum raziana</i> Keshav et Yog	Dati, Randivaji	Euphorbiaceae	Shrub	Latex	Latex is applied externally
7	<i>Butea monosperma</i> (Lam) Taub	Palas	Papilionaceae	Tree	Flowers	Dried flowers are kept in water for ½ hours and used for bath
8	<i>Cassia fistula</i> L.	Bahava, Garmal	Caesalpiniaceae	Tree	Leaves	Leaf decoction given orally
9	<i>Cassia tora</i> L.	Tarota, Dukkarsheng	Caesalpiniaceae	Herb	Seeds	Seed powder mixed in coconut oil to prepare paste and applied externally
10	<i>Calotropis gigantea</i> (L.) R.Br	Ruchkin, Rui	Asclepiadaceae	Shrub	Latex	Burst the pustules and apply latex
11	<i>Croton bonplandianum</i> Baill	Dudhani	Euphorbiaceae	Herb	Leaf and stem	Paste is applied externally
12	<i>Cyperus rotandus</i> L. Subsp. <i>Tuberosus</i> (Rottb)	Lahu, Lavale	Cyperaceae	Herb	Root	Root extract is applied externally



	<i>Datura innoxia</i> Mill	Dhotra	Solanaceae	Herb	Seeds	Seed oil is applied externally
14	<i>Euphorbia parviflora</i> L.	Dudhi	Euphorbiaceae	Herb	Stem	Latex is applied externally
15	<i>Euphorbia hirta</i> L.	Dudhnali, Dudhi	Euphorbiaceae	Herb	Whole plant	Whole plant paste is applied externally
16	<i>Ficus arnottiana</i> (Miq) Miq	Amasa, Amsa Khaunda	Moraceae	Tree	Stem Bark	Decoction of stem bark given orally
17	<i>Lepidogathis trinervis</i> Wall	Gathe-Gawat	Martyniaceae	Shurb	Whole plant	Whole plant paste is applied externally
18	<i>Marsdenia tenacissima</i> (Roxb) Moon	Isabvel	Asclepiadaceae	Herb	Latex	Latex of stem is applied externally
19	<i>Martynia annua</i> L.	Wagh-Nakhi, Kutri, Vinchhuda	Martyniaceae	Herb	Seeds	Seed oil is used externally
20	<i>Plumbago zeylanica</i> L.	Chitrak, Chitawal, Safed lepdī,	Plumbaginaceae	Shrub	Root	Root extract is applied externally
21	<i>Pongamia pinnata</i> L.	Karanj	Papilionaceae	Tree	Seeds	Seed oil is applied externally
22	<i>Psoralea corylifolia</i> L.	Gawar, Barchi	Papilionaceae	Shrub	Leaves	Fresh leaf juice used
23	<i>Solanum surattense</i> Burm	Ran-wange, Bhui-ringani	Solanaceae	Herb	Flower	Flower extract is applied externally
24	<i>Securinega virosa</i> (Willd) Mall. Arg.	Safed shini, Pandharphali	Euphorbiaceae	Shrub	Leaf	Leaf paste is applied externally
25	<i>Soyimida febrifuga</i> (Roxb) A. Juss	Rohin, Rohan, Ginya	Meliaceae	Tree	Stem bark	Bark paste is applied externally
26	<i>Tamarindus indica</i> L.	Chinch, Emali	Caesalpiniaceae	Tree	Bark	Bark extract is applied externally
27	<i>Tricholepis glaberrima</i> DC	Brahma dandi	Compositae	Herb	Root	Root extract is applied externally
28	<i>Typha angustifolia</i> L.	Deodanda, Pankanis	Typhaceae	Herb	Inflorescence	Inflorescence is rubbed on body

Table 2

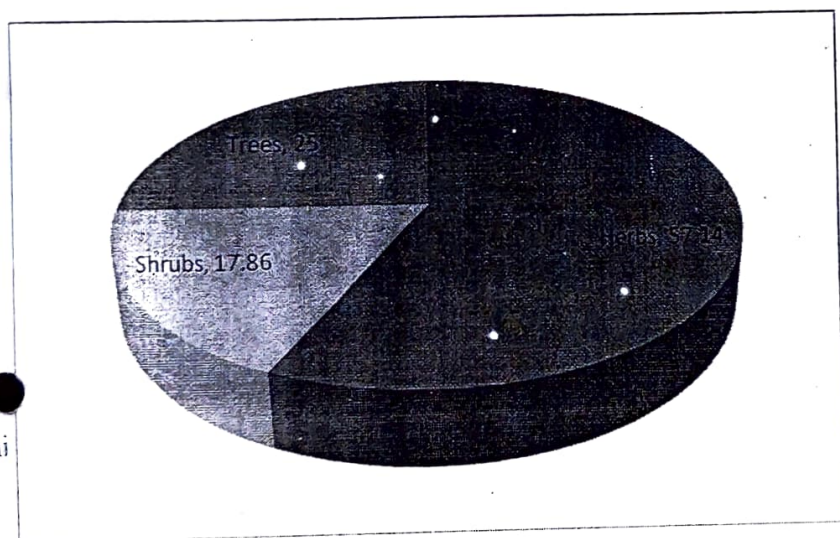
Sr. no	Name of family	Total no of species	Percentage
1	Amaranthaceae	1	3.57
2	Araceae	2	7.14
3	Asclepiadaceae	2	7.14
4	Caesalpiniaceae	3	10.71
5	Compositae	1	3.57

8	Cyperaceae	1	3.57
9	Euphorbiaceae	5	17.86
10	Martyniaceae	2	7.14
11	Meliaceae	2	7.14
12	Moraceae	1	3.57
13	Papavaraceae	1	3.57
14	Papilionaceae	3	10.71
15	Plumbaginaceae	1	3.57
16	Solanaceae	2	7.14
17	Typhaceae	1	3.57
#	Total	28	100 (99.97)



Table 3

Sr. no	Habit of plant	No. of plant species	Percentage
1	Herbs	16	57.14
2	Shrubs	05	17.86
3	Trees	07	25.00
#	Total	28	100



Result and Discussion

The present study deals with medicinal plants which are being used traditionally on skin diseases (Scabies) in forest area of Navapur Taluka, Nandurbar District. These plants belonging to 28 species 26 genera and 15 families. Various parts like root stem, fruits, leaves, bark, seeds etc. or entire plant are used on skin disease. The most dominant families are Euphorbiaceae, Caesalpiniaceae and Papilionaceae

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16. Impact of Various Types of Gulmohar (*Delonix Regia* Boj. ex Hook.) Compost on Productivity of Fodder Maize

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Abstract

Gulmohar (*Delonix regia* Boj. ex Hook.) belongs to family fabaceae, remains green for ten months in a year and having faster regrowth without maintenance, grows well in tropical and subtropical climate. It is a legume, so gives high nitrogen content. It is planted as an ornamental plant. Beside this, the foliage also can be used for green manuring and preparation of other organic manures.

The aim of the present investigation was to find out the effect of gulmohar compost prepared by aerobic (NADEP) and anaerobic (Bangalore) pit methods on productivity of fodder maize (*Zea mays* L.). The field experiment was conducted in research farm of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, during Oct. 2006 – Jan 2007. The experiment was conducted in plots of size 150 x 150 cm with six treatments and four replications. The composts were used as gulmohar vermicompost (GVC), gulmohar compost (GCO), green leaf manure (GLM) and dry leaf manure (DLM) with recommended fertilizer (N120:P80:K40) Kg/ha and absolute control. The fodder maize (*Zea mays* L.) var. 'African Tall' (Mahalaxmi) produced by Mahendra Hybrid Seeds Co. Ltd., Jalna was sown at a rate of 100 kg/ha. The physiological traits of the crop were noted at 78 days after sowing (DAS).

On the basis of statistical analysis it has been observed that all the values of fresh weight, dry matter, nitrogen, crude protein (Kg/ha) and reducing sugar (Kg/ha) were significant in all the



treatments over CON. The percent increase over control for fresh weight and dry weight (Kg/ha) was found maximum with the fertilization of GLM. The nitrogen efficiency ratio for fresh vegetation was highest in the plots treated with DLM, while in case of dry matter (Kg/ha) was highest in the plots treated with GLM.

Green leaf manure and dry leaf manure prepared from gulmohar foliages are the best, active and cheapest source of plant nutrients working with high efficiency as compared to fertilizer treatment.

Key words: Gulmohar, Compost, Maize.

Introduction

Gulmohar (*Delonix regia* Boj. ex Hook.) belongs to family fabaceae, remains green for ten months in a year and having faster regrowth without maintenance, grows well in tropical and subtropical climate. It is a legume, so gives high nitrogen content. It is planted as an ornamental plant. Beside this, the foliage also can be used for green manuring and preparation of other organic manures.

Maize is almost an ideal forage crop. It is a quick growing high yielding, palatable and nutritious (Narayanan and Dabadghao, 1972; Relwani, 1979). In India, maize can be grown in wide range of climatic conditions. Different varieties of maize take from 60 to 90 days to harvest for fodder. The crop can be fed to cattle safely at any stage of growth. The yield of fresh fodder varies from 157 to 280 quintals per hectare (Narayanan and Dabadghao, 1972). The aim of the present investigation was to find out the effect of gulmohar compost prepared by aerobic (NADEP) and anaerobic (Bangalore) pit methods on productivity of fodder maize (*Zea mays* L.).

Materials and Methods

Experimental Site and Design

The field experiment was conducted in research farm of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, during Oct. 2006 – Jan 2007. The experiment was conducted in plots of size 150 x 150 cm with six treatments and four replications. The composts were used as gulmohar vermicompost (GVC), gulmohar compost (GCO), green leaf manure (GLM) and dry leaf manure (DLM) with recommended fertilizer (N120:P80:K40) Kg/ha and absolute control. The fodder maize (*Zea mays* L.) var. 'African Tall' (Mahalaxmi) produced by Mahendra Hybrid Seeds Co. Ltd., Jalna was sown at a rate of 100 kg/ha. The physiological traits of the crop were noted at 78 days after sowing (DAS).



Collection, Treatments and Plot Size

The fresh vegetation of Gulmohar (*Delonix regia* Boj. ex Hook.) was collected from the Dr. Babasaheb Ambedkar Marathwada University campus, brought to laboratory and chopped into small pieces (2 to 3 cm) by iron cutter. Equal amount (13333 kg ha⁻¹) of leaf vegetation was used for the preparation of gulmohar vermicompost (GVC), gulmohar compost (GCO), green leaf manure (GLM) and dry leaf manure (DLM). The fresh vegetation of Gulmohar was spread on the hygienic floor and subsequently sprayed with 5 % urea and single super phosphate (SSP) and another lot of fresh vegetation was also sprayed with 5 % dung slurry to enhance the composting process. These pretreated materials were arranged alternately along with well-composted inoculum and soil on each layer in the aerobic tanks and anaerobic pits. Sufficient water was sprinkled in order to maintain the optimal moisture (50 to 70) over the material. The pits were enclosed with dung-mud paste to prevent loss of moisture or heat and allowed to decompose. The trenches were watered whenever the dampness was less than 50. The pits were again irrigated and closed by dung-mud mixture. Finally, amorphous, dark brown, well-fermented composts were obtained. The uniformly mixed samples (100 g) of each treatment were collected immediately from the pits for nutrients analysis.

Chemical Analysis

The chemical analyses were done by adopting standard analytical methods. The chlorophyll contents (a, b and total) were estimated (Arnon, 1949), using 80 % acetone as a solvent for the extraction of pigments. Ash values were obtained by burning the moisture-free samples in a muffle furnace at 600°C for 2 hours and calcium (Ca) Content was calculated by titrating the sample against 0.01 N KMnO₄ solution using methyl red as indicator (AOAC, 1995). Nitrogen (N) was estimated by micro-Kjeldahl method after digesting the sample with Conc. H₂SO₄ (Bailey, 1967) and crude protein (CP) was then calculated by multiplying N value with 6.25 as specified by AOAC, (1995). The dry samples were boiled in distilled water, filtered and amount of water soluble reducing sugars was determined in the filtrate by using Folin-wu tubes (Oser, 1979). The amount of phosphorus was measured following Fiske and Subba Rau (1925) as described by Oser (1979). Potassium (K) Content was determined on a flame photometer (model Mediflame- 127) as suggested by Jackson (1973). Taking in to consideration the yield of dry matter and N content in it, total N accumulated by above ground biomass was calculated for each treatment. The amount of extra N accumulated was worked out by

subtracting the amount of N accumulated in control or untreated. With the help of extra N accumulated and that supply with either urea or various compost, the efficiency of nitrogen used by the plants was calculated.

Statistical Analysis

All the results were statistically analyzed using analysis of variance (ANOVA) test and treatment means were compared using the least significant difference (C.D., $p = 0.05$) which allowed determination of significance between different applications (Mungikar, 1997).

Results and Discussion

Analysis of Gulmohar Compost

The equal amount of fresh vegetation was used for the Green manure, Dry leaf manure, and for the preparation of Compost and Vermicompost i.e. 13333 Kg ha⁻¹. The analysis of Gulmohar compost as fresh weight per plot, Kg ha⁻¹, DM, N, P, K content, Ash percentage Carbon percentage and C : N ratio respectively, showing the input for the experiment (Table 1).

Table 1. Analysis of Gulmohar Compost

Treat ment	Fresh total wt	Fresh wt. Kg ha ⁻¹	Dry Matter Kg ha ⁻¹	N %	P %	K %	Ash %	C %	C:N
GVC	60.00	16667	10340	0.67	0.53	0.65	39.00	22.50	33.58
GCO	68.00	18889	9858	0.88	0.65	0.52	28.00	16.00	18.18
GLM	48.00	13333	3867	1.50	1.07	0.72	5.50	3.00	2.00
DLM	18.00	13333	4161	1.25	0.55	1.00	6.80	3.95	3.16

GVC = Gulmohar Vermi compost, GCO = Gulmohar compost, GLM = Green leaf manure, DLM = Dry leaf manure

Table 2. Analysis of total aerial biomass of Maize plants (Age of crop: 89 DAS)

Treatment	(Kg ha ⁻¹)				Mineral content (%)						
	Fr. wt.	DM.	N	TRS	TRS	N	P	K	CP	Ca	
GVC	26111	4699	68	205	4.37	1.44	0.99	0.80	9.00	0.25	
GCO	25833	4825	70	327	6.77	1.46	0.68	0.40	9.13	0.23	
GLM	25278	4762	60	266	5.59	1.25	0.89	0.50	7.81	0.25	
DLM	25000	4589	70	307	6.68	1.52	0.84	0.30	9.50	0.24	
FER	21944	4183	87	148	3.54	2.08	0.87	0.40	13.00	0.20	

CON	11389	2414	30	95		3.93	1.25	0.74	0.40	7.81	0.19
S.E. ±	2323	378	8	37		0.57	0.12	0.05	0.07	0.78	0.01
C.D.(p=0.5%)	5970	971	20	96		1.46	0.31	0.13	0.18	2.00	0.03

All the values are means of four replicates

Analysis of Maize Crop

The average yield of fresh aerial biomass (Kg ha^{-1}) of maize was highest in the plots received with vermicompost amendment followed in order by compost, green leaf manure, dry leaf manure, fertilizer and lowest in control. The dry matter of maize was found maximum in the treatment of GCO, followed in order by GLM, GVC, DLM and FER, while it was lowest in CON. The nitrogen content (Kg ha^{-1}) was found maximum in the treatment of FER, followed in order by DLM, GVC, GLM and GCO, while it was minimum in CON. The total reducing sugar content (Kg ha^{-1}) was observed maximum in the treatment of GCO, followed by DLM, GLM, GVC and FER, while it was found minimum in CON. (Table 2).

Per Cent Increase Over CON and N Efficiency Ratio

The per cent increase over CON for fresh weight was found maximum with the treatment GVC followed in order by GCO, GLM, DLM treatments and minimum in FER applied plots. The per cent increase over CON for dry weight was maximum with the treatment followed by GCO, GLM, GVC, DLM, and minimum in FER (fig. 1), while the nitrogen efficiency ratio for fresh vegetation and dry matter was highest in the plots treated with DLM, followed by GLM, GVC, GCO application and then in FER treatment, where N was supplied through urea given the lowest efficiency (Fig. 2).

All the results are calculated on the dry matter basis and the values are the means of four replicates.

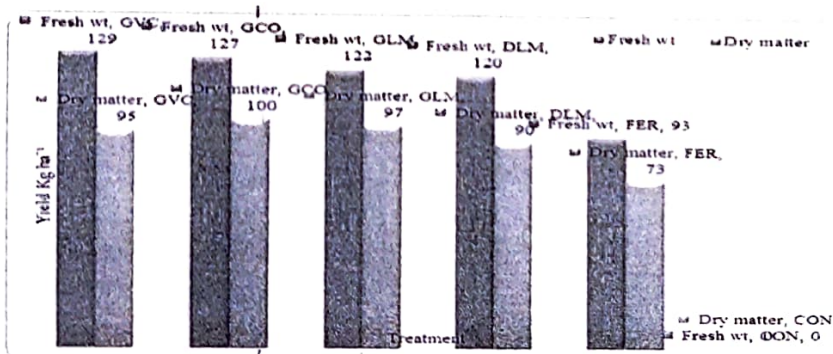


Fig. 1: Per Cent Increase Over Control

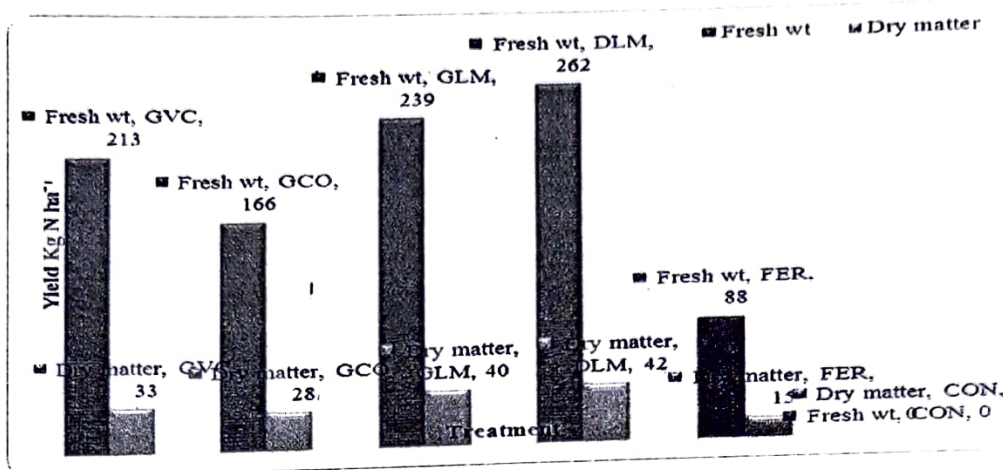


Fig. 2: Nitrogen Efficiency Ratio

Conclusions

The application of vermicompost and compost prepared from gulmohar foliage statistically increased the growth, nutrient uptake and yield of maize.

On the basis of statistical analysis it has been observed that all the values of fresh weight, dry matter, nitrogen, crude protein (Kg/ha) and reducing sugar (Kg/ha) were significant in all the treatments over CON. The percent increase over control for fresh weight and dry weight (Kg/ha) was found maximum with the fertilization of GLM. The nitrogen efficiency ratio for fresh vegetation was highest in the plots treated with DLM, while in case of dry matter (Kg/ha) was highest in the plots treated with GLM.

The use of fresh vegetation and dry leaf manure proved to be the best source of nutrient as compared to the compost and vermicompost. The preparation cost and time for compost and vermicompost will also reduce the nutrient contents by the microorganism which all can be saved by using green manure and dry leaf manure. This green vegetation which is available throughout the year free of cost, having better plant nutrient and best regrowth capacity of vegetation.

Green leaf manure and dry leaf manure prepared from gulmohar foliages are the best, active and cheapest source of plant nutrients working with high efficiency as compared to fertilizer treatment.



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27. Phytochemical Studies of *Datura Innoxia* Mill in Marathwada Region, Maharashtra

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Abstract

The members of *Datura* are well known as a poisonous as well as hallucinogenic plants, they also have some medicinal properties (Bhattacharjee et al, 2004). *Datura innoxia* Mill. belongs to family Solanaceae. It is an annual to perennial herb. This family is well known for their alkaloids contains. In ethnobotanical literature this genus has great medicinal importance. Attempts were made to find out the phytochemicals qualitatively and quantitatively from various plant parts like root, stem, leaves, seeds, fruit coat of *Datura innoxia* Mill.

Key words: Phytochemical, *Datura Innoxia* Mill, quantitative

Introduction

Datura innoxia Mill. belonging to family Solanaceae. In some European countries it is cultivated In India, it is grown in Bangalore, Ahmedabad, Pune, Lucknow, pilani and Jammu (Bhattacharjee and Supriya 1998). It is native to the America and introduced to Africa Asia Australia and Europe (Wikipedia, 2006). It is commonly known as Angels trumpet, thorn apple, Indian- apple, moonflower or sacred *Datura*.

In ancient India, Charaka and Sushruta given special place to *Datura* in Ayurveda. All parts of plants were used for medication, these include in the treatment of Leprosy, Rabies, insanity etc. (Bhattacharjee et al, 2004). Morphologically, *D. innoxia* Mill. is erect gray tomentose, much branched herb. It attends height about 60 to 90 cm, stem woody below. Its leaves are ovate unequal sided and sub-cordate at the base, sinuate -dentate, densely soft pubescent on both surfaces. Petioles are 5 to 10 cm long, tomentose flower solitary; peduncle 1-1.5 cm long; densely pubescent. Calyx is 6- 10 cm long, tubular pubescent outside; teeth triangular acute 1-2 cm long. The Corolla is pure white 10 to 12 cm, lobes deltoid acute with 5 to 6 mm long teeth alternating with them. filaments adnate to corolla tube for a considerable length.

Capsule globos, 2.5 to 3.5 cm in diameter minutely gray tomentose clothed with long slender weak spines, seeds Sub reniform, pale brown, smooth and the flowering and fruiting in September to March (Naik et al 1998).

All plant parts are anodyne, antispasmodic, hallucinogenic, hypnotic and narcotic. It used in the past as pain killer and also in the treatment of insanity, fevers, diarrhea and skin diseases (Tropical Plant database). The plant has various uses, like seed oil is used for treatment of painful joints, poultice of leaf is applied in piles and skin diseases as well as leaves are smoke for asthma. Seed extract and dry grapes used for asthma and cough (Syed et al. 2006). Leaves are applied externally on swelling of limbs, its extract is helpful in toothache and epilepsy. Leaf extract affect the nervous system overdose main induced vomiting, coma and even death. Seeds are antipyretic and narcotic. Dried leaves and seeds are used in the treatment of asthma. Plant is commercial source of scopolamine used as pre-aesthetic in surgery in ophthalmology and prevention of motion sickness (Purohit and Vyas, 2004).

Methods and Materials

Datura innoxia Mill. was collected from the various part of Marathwada region. It was collected and kept in polythene bags and brought to the laboratory. It was sorted out into root, stem, leaf, seeds and fruit coat. The plant parts where are dried in natural condition and after that it was kept in oven at 60°C up to constant weight. After the complete drying, the plant parts cut into small pieces and ground into fine powder. It was store in the sealed container, this fine powder of the plant parts where used for the chemical analysis. The plant powder was used for various qualitative and quantitative analysis. Form the powder qualitative analysis for alkaloids, tannins, saponins and iridoids (Gibbs, 1974, Deniel and Sabnis 1979; Dhabe, 2003) was done. In quantitative analysis various parameters were studied like total Ash, acid soluble Ash, acid insoluble Ash, water soluble Ash, water insoluble Ash, calcium, phosphorus, sodium, potassium, nitrogen, crude protein, crude fiber, crude fat, gross energy, total sugar, reducing sugar, non-reducing sugar, amino acids (Mungikar, 1999) amino nitrogen, phenol, tanning, and total alkaloids (Sadasivam and Manickam, 1992).

Table No. 01: Quantitative Analysis of *Datura Innoxia* Mill

Sr. no.	Chemical parameters	Plant part				
		Root	Stem	Leaf	Seeds	Fruit coat
1	Total ash	19	16.6	13.1	5.7	15.2
2	Water insoluble ash	18.3	15.7	10.9	3.8	7.8



3	Water soluble ash	0.7	0.9	2.2	1.9	7.4
4	Acid soluble ash	15.5	12.1	10.6	03.2	12.7
5	Acid insoluble ash	3.5	4.5	2.5	2.5	2.5
6	Water soluble nitrogen	1.25	1.0	3.0	2.0	2.5
7	Nitrogen	1.83	1.83	4.16	2.16	1.58
8	Calcium	0.52	0.22	0.85	0.18	0.21
9	Phosphorous	0.19	0.3	0.3	0.45	0.38
10	Potassium	0.172	0.305	0.18	0.111	0.274
11	Crude fat	6	9	3.69	22.65	6.5
12	Crude protein	11.45	11.45	26.04	13.54	9.89
13	Gross energy	2.68	2.65	3.26	3.65	3.08
14	Reducing sugar	0.45	0.15	4.23	0.97	0.99
15	Total sugar	0.66	0.51	4.41	1.3	1.33
16	Non reducing sugar	0.21	0.36	0.18	0.33	0.34
17	Crude fiber	2.5	2	3	1.5	1
18	Nitrogen free extract	61.05	60.95	54.17	56.61	67.41
19	Total carbohydrate	63.55	62.95	57.17	58.11	68.41
20	Total free amino acids	0.14	0.74	1.74	0.1	0.14
21	Amino nitrogen	0.014	0.079	0.188	0.01	0.014
22	Cellulose	39.8	37.7	17.8	26.7	38.1
23	Total alkaloids	1.02	1	9.7	11.08	1
24	Phenol	0.04	0.03	0.33	0.1	0.05
25	Tannins	0.15	0.2	0.87	0.18	0.13

Table No. 02: Qualitative Analysis of Datura Innoxia Mill

Sr. no.	Plant part	Chemical parameters			
		Tannins	Saponins	Alkaloids	Irredoids
1	Root	+	+	+	-
2	Stem	++	+++	+	-
3	Leaf	+++	+++	+++	-
4	Seeds	++	+++	+++	+
5	Fruit coat	+++	++	++	-

Result and Discussion

Ash value is useful in determining authenticity and purity of sample and these values are important qualitative standards (Bhargava et.al, 2013). Apart from all the parameters (Table No.01) the root sample shows the high percentage of total Ash, water insoluble ash, Acid soluble

ash and cellulose. Acid insoluble ash, potassium, non reducing sugar shows maximum percentage as compared to all the parameters. Seeds contain phosphorus, crude fat, gross energy and total alkaloids in maximum amount. Nitrogen free extract and total carbohydrate were found maximum in fruit coat. Rest of the chemical parameters were found maximum the leaf power i.e. water soluble ash, water soluble nitrogen, calcium, nitrogen, crude protein, reducing sugar, total sugar, crude fiber, total free amino acids, amino nitrogen, phenols and tannin.

From qualitative analysis (Table no. 02) it is clear that, tannin saponins, alkaloids are present in all the parts of the plant, but iridoids is absent all the parts of the plant except seeds. Tannins were found maximum in leaf and fruit coat, less in root while moderate in stem and seeds. Saponin present in stem, leaf, seed sample in more amount while moderate in fruit coat and less in roots. Less amount of alkaloids found in root and stem while moderate amount found in fruit coat and maximum found in leaf and seeds.

Conclusion

From the above discussion it can be conclude that all parameters useful to determine authenticity and purity of samples. As the qualitative analysis shows that, tannins, saponins and alkaloids present in *Datura innoxia* Mill. more or less amount, while iridoids were absent in all parts except seeds. In quantitative analysis leaf sample shows highest amount of chemical compounds it was also confirmed by Sangekar S.N. & Devarkar V.D. (2017). All parameters can be useful in determining authenticity and purity of sample and these values are important qualitative standards.

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10. Some Common Aquatic Plants of Dudhana Dam Jalna District, Marathwada, Maharashtra

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Abstract

The paper deals with the report on some of the more common aquatic plants of Beed district. The data like general vegetation pattern of the ponds, lakes, pH of water etc. have been presented together with the enumeration of 25 plants collected by Dudhana Dam district.

Key world: Aquatic plants, Beed district, Marathwada.

Introduction

This part of the Taluka Partur Dist. Jalna. Partur is birth place of bhakt pralhad the son of hiranya kashku located at 19.35°N 76.12°E.(District Website). It has an average elevation of 439 metres (1440 feet). Godavari is major river flows through various villages of Partur. Near Dudhana river Upper Dudhana Dam. Bageshvari Sugar Factory, Warfal in Partur.

The Lower Dudhna Major Irrigation Project is being constructed in the Godavari basin in Parbhani district of Maharashtra. The project comprises of the following components.

- i. 6581.20 m long earth dam with the maximum height of 18.52 m and 438.80 m long masonry/concrete dam of the maximum height of 28.60 m having 65 m long left non-overflow blocks, 303.30 m long gated spillway and 70.50 m long right non-overflow blocks across river Dudhna near Brahma-Wakdi village in Selu Taluka of Parbhani district.
- ii. Two head regulators for two canals constructed on left flank and right flank.
- iii. 69 km long Left Bank Canal (LBC) and 48 km long Right Bank Canal (RBC) having head discharge of 8.50 m³/s and 6.90 m³/s respectively.

iv. Distribution network on LBC and RBC to irrigate CCA of 38264 ha in Parbhani and Jalna districts out of which 801 ha lies in Jalna. The canal system will create the annual ultimate irrigation potential of 44482 ha in Parbhani and Jalna districts, of which 932 ha is in Jalna.

vi. The project will also provide 6.44 Mm³ water for domestic use and 1.64 Mm³ water for industrial use.

Most of them harbor a luxuriant plant wealth mostly dominated by **Nymphaea nauchali**, **Nymphaea pubescens**, **Nelumbo nucifera**, **Potamogeton nodosus**, **Aponogeton natans** with their leaves floating and covering more or less entire surface of water. With these dominants there grown a large number of submerged aquatic and marginal. The submerged ones includes **Vallisneria spiralis**, **Hydrilla verticillata**, **Najas graminea**, **Nechamandra alternifolia** etc. while the common marginals include **Typha angustata**, several numbers of sedges and grasses, **Phylla nodiflora** **Bacopa monnieri** and others.

During our field survey, many taxa were collected from Dudhana Dam. Specimens were brought to laboratory and processed for herbarium specimens with standard procedures. Majority of the specimens were satisfactorily identified by using pertinent literature Naik *et al.* (1998). After critical investigations authors found that many taxa are not reported from the region. Following is the enumeration of common aquatic plants collected during the year, together with their updated nomenclature, family, flowering and fruiting season, exsiccata, localities, and short description. The classification and sequence adopted here is that of APG system.

This paper deals with some of the preliminary observation made during the year, together with an enumeration of more common aquatic plants of the area.

Enumeration

Nymphaea nouchali Burm. f. Fl. Ind. 120. 1768; Mitra in Sharma et al. Fl. India 1: 430. 1993. *N. stellate* Willd. Sp. Pl. 2: 1153. 1799; Hook.f. & Thoms. In Hook.f. Fl. Brit. India 1: 114. 1872; Cooke, Fl. Pres. Bombay 1: 27. 1958 (Repr.). '*Uplia Kamal*'. (**Nymphaeaceae**). **Plate-I, A.**

Aquatic herbs; root stock short, ovoid, acute. Leaves 20-30 x 15-25 cm, orbicular or elliptic, peltate, green above, purplish below; petioles slender. Flowers white or red, 7-15 cm across, solitary. Nutlets globular. Seeds longitudinally striate. *Exsiccata*: SAS; 9147.

Fls. & Frts.: Throughout the year *Locality*: Upper Dudhana



Nymphaea pubescens Willd Sp. Pl. 2: 1154. 1799; Mitra in Sharma et al. Fl. India 1: 430. 1993. *N. lotus* auct. Non L. 1753; Hook.f. & Thoms. Fl. India 241. 1855; Cooke, Fl. Pres. Bombay 1: 27. 1958 (Repr.). '*Kamal*'. (**Nymphaeaceae**). **Plate-I, B.**

Aquatic herbs; root stock short, ovoid, erect. Roundish, tuberous. Leaves 15-25 cm, across, orbicular or reniform-sagittate deeply cordate. Flowers red, pale rose or white, 7-20 cm across, solitary. Nutlets fleshy globose. Seeds ovoid rough. *Exsiccata*: SAS; 9148

Fls. & Frts.: Throughout the year

Locality: Upper Dudhana

Nelumbo nucifera Gaertn. Fruct. 1: 73, t. 19, f. 2. 1788; Subram. Aq. Ang. 8, 116, f. 4. 1962; Mitra in Sharma et al. Fl. India 1: 430. 1993. *Nelumbium speciosum* Willd Sp. Pl. 2: 1158. 1799; Hook.f. & Thoms. In Hook.f. Fl. Brit. India 1: 116. 1872; Cooke, Fl. Pres. Bombay 1: 28. 1958 (Repr.). '*Kamal*'. (**Nelumbonaceae**) **Plate-I, C.**

Aquatic herbs; rhizomes slender elongate, creeping, branched. Leaves 0.3-0.9 m across, glossy or waxy, glaucous beneath, radiatingly reticulate. Flowers white or rosy, 10-25 cm across, solitary, erect or cernous; scape sheathing, as long as petioles. Ripe carpels 1.25 cm long, ovoid, glabrous; nutlets smooth. *Exsiccata*: SAS; 9159

Fls. & Frts.: July-October

Locality: Upper Dudhana

Cleome chelidonii L. f. *Suppl.* Pl. 300. 1781; Hook.f. & Thoms. in Hook. f. Fl. Brit. India 1: 170. 1872; Cooke, Fl. Pres. Bombay 1: 42. 1958 (Repr.); Jacobs in Steenis Fl. Males 1, 6: 102. 1960; Raghavan in Sharma et al. Fl. India 2: 306, f. 58. 1993. (**Cleomaceae**) **Plate-I, D.**

Annual herbs, 30-60 cm tall, strate. Leaves 3-7 foliolate below and simple above; leaflet 2-5 x 0.5-0.7 cm oblong-obovate below and narrow-linear above. Flowers in axillary and terminal racemes. Capsules 5-8 cm long, cylindrical, slender, tapering at both ends. Seeds yellowish-brown. *Exsiccata*: SAS; 9162

Fls. & Frts.: July-October

Locality: Lower Dudhana

Sesbania bispinosa (Jacq.) W. F. Wight, in U. S. Dept. Agric. Bur. Pl. Ind. Bull. 137. 15. 1909; *Aeschynomene bispinosa* Jacq. Ic. Rar. 3: 13 t. 564. 1792; Lakshmin. & B.D. Sharma Fl. Nashik Dt. 178. 1991; Kothari in N.P. Singh et al. Fl. Maharashtra St. Dicot. 1: 735. 2000. *Ran Shevri*. (**Fabaceae**) **Plate-I, E.**

Erect, sparingly branched, annual herbs. Leaflets: 20-50 pairs, 0.6-2x0.2-0.3cm, linear-oblong, apex, obtuse. Flower: in lax axillary, 3-6 flowered, 2-3.5cm long, drooping racemes; calyx memberanous, 3-4mm long, glabrous, teeth deltoid; corolla 10-12mm long, glabrous. Pods:

linear, 15-20cm long, beaked. Seeds: 30-40, oblong, Pale yellow. *Exsiccata* : SAS; 9190

Fls. & Frts.: September-November *Locality*: Upper Dudhana

***Ammannia baccifera* L. Var. *aegyptiaca* (Willd.) Koehne** in Engl. Bot. Jahrb.1: 258. 1880. *A. aegyptiaca* Willd. Fl. Enum. Hort. Berol. 1: 6, t. 6. 1803. *A. salticifolia* Hiern in Oliv. Trop. Afr. 2: 478. 1871 exc. Syn. Non Monti ex Bl. 1856; C. B. Cl. in Hook.f. Fl. Brit. India 2: 569. 1879; Cooke, Fl. Pres. Bombay 1: 542. 1958 (Repr.). (**Lythraceae**) **Plate-I, F.**

Erect herbs; stems and branches more robust, 0.3-0.5 m tall Leaves 1-2 x 0.2 cm, linear-oblong or oblong-lanceolate, base rounded or cordate. Flowers red in dense axillary fascicles. Capsules 0.2-0.3 cm across. *Exsiccata*: SAS; 9160

Fls. & Frts.: October-December *Locality*: Lower Dudhana

Coldenia procumbens* L. Sp. Pl. 125. 1753; C.B.cl. in Hook. f. Fl. Brit. India 4: 144. 1883; Cooke, Fl. Pres. Bombay 2: 271. 1958 (Repr.); Kazmi in J. Arnold Arbor. 51: 148. 1970. 'Tripanki'. (**Boraginaceae**) **Plate-I, G.*

Spreading herbs, white hairy. Leaves 1.2-3.5 x 0.6-1.9 cm, ovate-oblong or obovate-oblong, hairy on sides, crisped, apex obtuse, base acute, oblique, margins crenate-dentate. Flowers white, 0.4-0.5 cm wide, sessile, 4-merous; calyx-lobes ovate; corolla lobes 0.25 cm long, oblong, spreading. Drupes 0.3-0.4 cm long, beaked, 4-lobed and breaking into 4-pyrenes. *Exsiccata*: SAS; 9194.

Fls. & Frts.: December-April *Locality*: Dudhana River

Grangea maderaspatana* (L.) Poir. in Lam. Encycl. (Suppl. 2.) 825. 1812. *Artemisia maderaspatana* L. Sp. Pl. 849. 1753; Hook. f. Fl. Brit. India 3: 247. 1881; Shirodkar & Lakshmin. in N.P. Singh *et al.* Fl. Maharashtra St. Dicot. 2: 218. 2001. (**Asteraceae**) **Plate-I, H.*

Prostrate annual herbs. Stems: many, spreading from the centre, 10-30cm long, pubescent. Leaves: alternate, sessile, pinnatifid, 2-5cm long; lobes opposite or subopposite, the terminal lobe the largest, all coarsely serrate dentate, pubescent. Marginal florets: female, with filiform 2-fid yellow corollas; central bisexual, 4-5-fid, tubular, yellow. Achenes: subterete, 2-3mm long, glandular. *Exsiccata*: SAS; 9198.

Fls. & Frts.: Dec.-March *Locality*: Upper Dudhana

***Limnophila indica* (L.) Druce** in Rep. Bot. Exch. Cl. Brit. Isles 3: 420. 1914; Philcox in Kew Bull. 24: 115. 1970. *Hottonia indica* L. Syst. Nat. ed. 10. 991. 1759. *Limnophila*



gratioloides R.Br. Prodr. 442. 1810; Hook. F. Fl. Brit. India 4: 271. 1884; Cooke, Fl. Pres. Bombay 2: 362. 1958. (Repr.). (**Scrophulariaceae**) **Plate-I, I.**

Herbs, aquatic or marshy, 15-20 cm high, rooting at nodes. Leaves on aerial stems, 0.5-1.9 x 0.15-0.3 cm, linear-elliptic or linear-oblong. Flowers pink or pale white violet-blue spots on lobes, solitary, axillary. Capsules 0.3 x 0.2 cm, subglobose. Seeds black. *Exsiccata*: SAS; 9127.

Fls. & Frts.: August-April

Locality: Dudhuna River

Bacopa monnieri (L.) Penn. in Proc. Acad. Nat. Sci. Philad. 98.94.1946. *Lysimachia Monnieri* L. Cent. Pl. 2:9.1756; Lakshmin. & B.D. Sharma Fl. Nashik Dt. 524. 1991; Godbole & Prasad in N.P. Singh *et al.* Fl. Maharashtra St. Dicot. 2:505. 2001. *Bam, Neer Brahmi.* (**Scrophulariaceae**) **Plate-I, J.**

Prostrate, creeping or procumbent herbs; stemfleshy, glabrous. Leaves: opposite or the upper alternate, sessile, 0.9x0.3cm obovate, glabrous, fleshy. Flowers: on slender 5-15mm long pedicels, bracteoles linear; calyx glabrous, acute. 3-4mm long; corolla blue or pale purple, 7-8mm long; stamens 4, anthers in pairs, bluish. Capsules: ovoid, 5-6mm long, acute, glabrous. *Exsiccata*: SAS; 9120

Fls. & Frts. : Almost throughout the year.

Locality: Upper Dudhana

Hygrophila schulli (Buch-Ham.)M.R. & S.M. Almieda in J. Bombay Nat. Hist. Soc. 83. (Suppl.) 221. 1986; Cooke, Fl. Pres. Bombay 2: 389. 1958 (Repr.); C.B.Cl. in Hook. F. FL. Brit. India 4: 328. 1884; *H. auriculata* (K. Schum.) Heine in Kew Bull. 16: 172. 1962. '*Kolsunda*', '*Talimkhana*'. (**Acanthaceae**) **Plate-I, K.**

Herbs, 0.5-1.5 M high, erect, stout; branched subquadrangular. Leaves sessile, 5.0-17 x 0.6-3.0 cm, appear whorl with 6 sharp, yellow spine, oblong-lanceolate or oblanceolate, sparsely hispid on both surfaces. Flowers purple-blue in a whorl at each noed. Capsules 0.8 cm long, linear-oblong. *Exsiccata*: SAS; 9167.

Fls. & Frts.: November-June

Locality: Upper Dudhana

Phylla nodiflora(L.)Greene in Pittonia 4; 46.1899; Sant.In Rec. Bot. Surv. India 16 (1): 211. 1967 (3rd Rev. ed.) *Verbena nodiflora* L. Sp. Pl. 20. 1753. *Lippia nodiflora* (L.) A. Rich. In Michaux, Fl. Bor. Amer. 2: 15. 1803; C.B.Cl.In Hook. F. Fl. Brit. India 4: 563. 1885; Cooke, Fl. Pres. Bombay 2: 499. 1958 (Repr.). '*Gour Mundi*', '*Ratoliva*'. (**Verbenaceae**) **Plate-I, L.**



Herbs, prostrate; stem appressed hairy. Leaves 0.3-2.5 x 0.1 cm, elliptic-obovate, upper half serrate, appressed hairy, base attenuate. Inflorescence of axillary spike. Flowers 0.3 cm long, whitish-pink. Drupe 0.2 x 1.5 cm, ellipsoid. *Exsiccata*: SAS; 9192

Fls. & Frts.: August-December

Locality: Upper Dudhana

Alternanthera sessilis (L.) R.Br. ex DC. Cat. Hort. Monsp. 77. 1813; Hook. F. Fl. Brit. India 4: 713. 1885; Townsend in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 1: 49. 1980; Chaudhury & Bhattacharyya in Bull. Bot Surv. India 36. 268, t. 1, figs. 1-8. (1994) 1997. Cooke, Fl. Pres. Bombay 2: 584. 1958 (Repr.). (**Amaranthaceae**) **Plate-I, M.**

Herbs, spreading, rooting at nodes. Leaves 0.5-5.0 x 0.3-1.0 cm, linear. Flowers white. Utricles 0.15 cm long, with thickened margins. Seeds orbicular. *Exsiccata*: SAS; 9171

Fls. & Frts.: Throughout year

Locality: Upper Dudhana

Persicaria glabra (Willd.) Gomez in Ann. Inst. Segunda Enseñ. Habana 2: 278. 1896; Hara in Hara et al. Enum. Fl. Pl. Nepal 3: 176. 1982. *Polygonum glabrum* Willd. Sp. Pl. 2: 447. 1799; Hook f. Fl. Brit. India 5: 34. 1886; Cooke, Fl. Pres. Bombay 3: 5. 1958 (Repr.) 'Sheral'. (**Polygonaceae**) **Plate-I, N.**

Herbs, semiaquatic or aquatic, stoloniferous. Leaves 6-23 x 0.7-3.5 cm, lanceolate, finely acuminate at apex, tapering at base, gland-dotted; ocreae conspicuously veined, truncate at mouth. Perianth pink. Nuts 0.3 cm across, ovoid or suborbicular, compressed, biconvex, brown to black. *Exsiccata*: SAS; 9190

Fls. & Frts.: Throughout year

Locality: Upper Dudhana

Ceratophyllum demersum L. Sp. Pl. 992.1753. *C. verticellatum* Roxb. Fl. Ind. 3: 624. 1832; Lakshmin. & B.D. Sharma Fl. Nashik Dt. 442. 1991; Venkanna & Kothari in N. P. Singhet al. Fl. Maharashtra St. Dicot. 2: 951. 2001. (**Ceratophyllaceae**) **Plate-I, O.**

Submerged, aquatic plants; stems 20-90cm long, forming much branched, tangle of slender branches and leaves. Leaves: whorled, dichotomously divided into filiform segments. Flowers: males with 6-12, narrow 2-fid tepals, stamens 20-30; females with sessile ovary and subulate styles. Fruits: ellipsoid. *Exsiccata*: SAS; 9169

Fls. & Frts.: Oct. - May

Locality: Dudhana

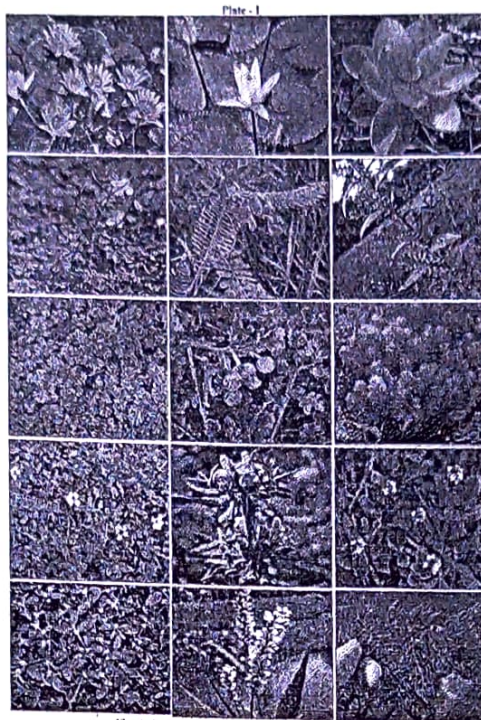


Fig. A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, Respectively

Hydrilla verticillata (L.f.) Royle, III Bot. Himal. T. 376. 1839; Hook.f. Fl. Brit. India 5: 659. 1888; Cooke, Fl. Bombay 3: 170. 1958 (Repr.); Hartog in Steenis, Fl. Melaes, 1, %, 385. F. 1. 1957. (**Hydrocharitaceae**) **Plate-II, P.**

Herbs, slender, submerged, free floating or rooting, 45 cm long; roots fibrous. Leaves 3-8, 0.6-1.5 cm long, long, linear-oblong, apex apiculate, margin serrate or serrulate. Flowers unisexual, white, male flowers minute, shortly pedicelled, solitary in subsessile; female flowers sessile, solitary in cylindrical, membranous spathes. Fruits smooth. *Exsiccata*: SAS; 9172

Fls. & Frts.: August-February

Locality: Dudhana River

Ottelia alisnoides (L.) Pers. Syn. Pl. 1: 400. 1805; Hook.f. Fl. Brit. India 5: 662. 1888; Cooke, Fl. Pres Bombay 3: 173. 1958 (Repr.); Hartog in Steenis, FL. Males. 1,5: 398, f. 10. 1957; Subr. Aquat. Ang. 61. 1962. (**Hydrocharitaceae**) **Plate-I, Q.**

Herbs, annual, submerged, flaccid. Leaves of two kinds; submerged leaves shortly petioled, narrow or oblong, tapering to base; floating ones oblong or orbicular, cordate or rounded at base, then narrowed into angled petiole, up to 18 cm in diam., 7-11 nerved. Flowers



white with yellow blotched base. Fruits 2.0-3.5 cm long ellipsoid. Seeds oblong-fusiform.

Exsiccata: SAS; 9175.

Fls. & Frts.: September-April

Locality: Back water Shreedhar Jawala

Vallisneria spiralis L. Sp. Pl. 1015. 1753; Hook. f. FL Brit. India 5:660. 1888; Cooke, Fl. Pres. Bombay 3:171. 1958 (Repr.); Subr. Aqua. Ang. 57. 1962. 'Saivala'. (**Hydrocharitaceae**)

Plate-II, R.

Herbs, tufted, submerged. Leaves linear, ribbon-shaped, sheathing at abase, apex obtuse, margins faintly dentate or entire. Flowers dioecious, on long or short scapes; male spathes shortly peduncles, included in spathes. Seeds numerous, oblong to fusiform, embedded in a gelatinous mass. *Exsiccata*: SAS; 9199

Fls. & Frts.: October-April

Locality: Dudhana River

Typha angustifolia L. Sp. Pl. 971.1753; Backer in Steenis, FL. Males.1, 4: 243, f. 1.1951; *T. angustata* Bory & Chaub. Exped. Sci. Moree Bot. 2, 1: 338. 1832; Hook f. Fl. Brit. India 6: 489. 1893; Cooke, Fl. Pres. Bombay 3: 326. 1958 (Repr.). 'Pan-kanis'. (**Typhaceae**)

Plate-II, S.

Herba, 1-2 m high, robust, tufted, perennial. Leaves 1.5-2.0 x 0.5-2.5 cm, linear, thick, subcylindrical above the sheath. Male and female spikes separated by a considerable interval which is up to 30.0 x 0.6-2.3 cm brown. Male flowers slender and paler than the female ones which are mixed with clavate sterile pistillodes. Nutlets small. *Exsiccata*: SAS; 9197

Fls. & Frts.: March-October

Locality: Dudhana River

Aponogeton natans (L.)Engl. &Kranse in Engl. Pflanzenr. 24: 11. 1906; Subr. Aquat. Ang. 92. T. 5. 1962; Van Bruggen in Blemea 18: 477, f. 2. (11) map 1. 1970. Saururusnatans L. Mant. 227. 1771; Aponogeton monostacyon L. f. Suppl. 214. 1781; Hook.f. Fl. Brit. India 6: 564. 1893; Cooke, Fl. Pres. Bombay 3: 348. 1958 (Repr.). (**Aponogetonaceae**) **Plate-II, T.**

Herbs, aquatic, submerged; tubers 1.5-2.0 cm across or elongate up to 3 x 2 cm. Submerged leaves lanceolate or oblong, 3-6 x 0.4-1.5 cm; floating leaves linear-oblong, 8-12 x 1.8-3.0 cm. Spathes 1.5 cm long. Spikes 3-8 x 0.4-0.5 cm. Flowers blue, bluish-violet, lilac or rosy pink. Follicles 3, subglobose, 0.4 x 0.3 cm. Seeds oblong, ribbed. *Exsiccata*: SAS; 9152

Fls. & Frts.: July-October

Locality: Dudhana



Potamogeton perfoliatus L. Sp. Pl. 126.1753; Hook.f. Fl. Brit. India 6: 566. 1893; Cooke, Fl. Pres. Bombay 3: 349. 1958 (Repr.); Subr. Aquat. Ang. 95. 1962; Aziz & Jafri in Nasir & Ali, Fl. W. Pak. 79: 5, 1, G-K. 1975. (**Potamogetonaceae**) Plate-II, U.

Herbs; stems terete, dichotomously branched. Leaves 2.5-6.2 x 1.0-2.5 cm, sessile, obtuse, membranous; stipules small, caduceous. Peduncles short. Spikes 0.63-2.25 cm long. Drupelets 0.2-0.35 x 0.15-0.2 cm, obliquely ovoid, slightly compressed, with a short usually curved beak. *Exsiccata*: SAS; 9182

Fls. & Frts.: February-April

Locality: Dudhana Lower

Cyperus corymbosus Rottb. Descr. Ic. 42, t. 7, 4. 1773. Lakshmin. & B.D. Sharma Fl. Nashik Dt. 499. 1991; Lakshmin. in Sharma *et al.* Fl. Maharashtra St. Monocot. 280. 1996. (**Cyperaceae**) Plate-II, V.

Perennial, 50-100 cm tall robust rhizomatous herbs. Leaves: linear, blades reduced or very short laminate, 5 - 10 cm long, sheaths glabrous. Flowers: in compound umbels, involucre bracts 3 - 4, often spreading as long as or shorter than the umbels. Nuts: obovoid, apiculate, trigonous ellipsoid, 1.2 x 0.4 mm, often flat, muticous. *Exsiccata*: SAS; 9140

Fls. & Frts.: July - Sept.

Locality: Upper Dudhana

Cyperus rotundus L. Sp. Pl. 45. 1753. ssp. **rotundus** C. B. Cl. in Hook. f. Fl. Brit. India 6: 614. 1893; Lakshmin & B.D. Sharma Fl. Nasik Dt. 502. 1991; Lakshmin in Sharma *et al.* Fl. Maharashtra St. Monocot. 293. 1996. (**Cyperaceae**) Plate-II, W.

Stout herbs, leaves 10-18 cm long, narrowly linear. Flowers: in compound umbels. Spikelets: 0.8 - 1 x 0.1 cm, linear, brown. Nuts: 0.15 cm long, broadly obovoid, greenish black. *Exsiccata*: SAS; 9142

Fls. & Frts.: July - Sept.

Locality: Upper Dudhana

Coix aquatic Roxb. Fl. Ind. 3: 571. 1832; Hook.f. Fl. Brit. India 7: 100. 1896; Bor, Grass. Ind. 264. 1960. (**Poaceae**) Plate-II, X.

Annuals or perennials, 60-150 cm tall. Leaves 20-60 x 1.5-2.5 cm, linear lanceolate, ensiform, long acuminate; ligule membranous. Spikes terminal. Flowers many, 3-6 cm long. Male spikelets 0.8 x 0.6 cm ovate-lanceolate or broadly ovate, arranged in 6 longitudinal rows; female spikelets solitary at base of male spike. *Exsiccata*: SAS; 9178

Fls. & Frts.: October-February

Locality: Dudhana River

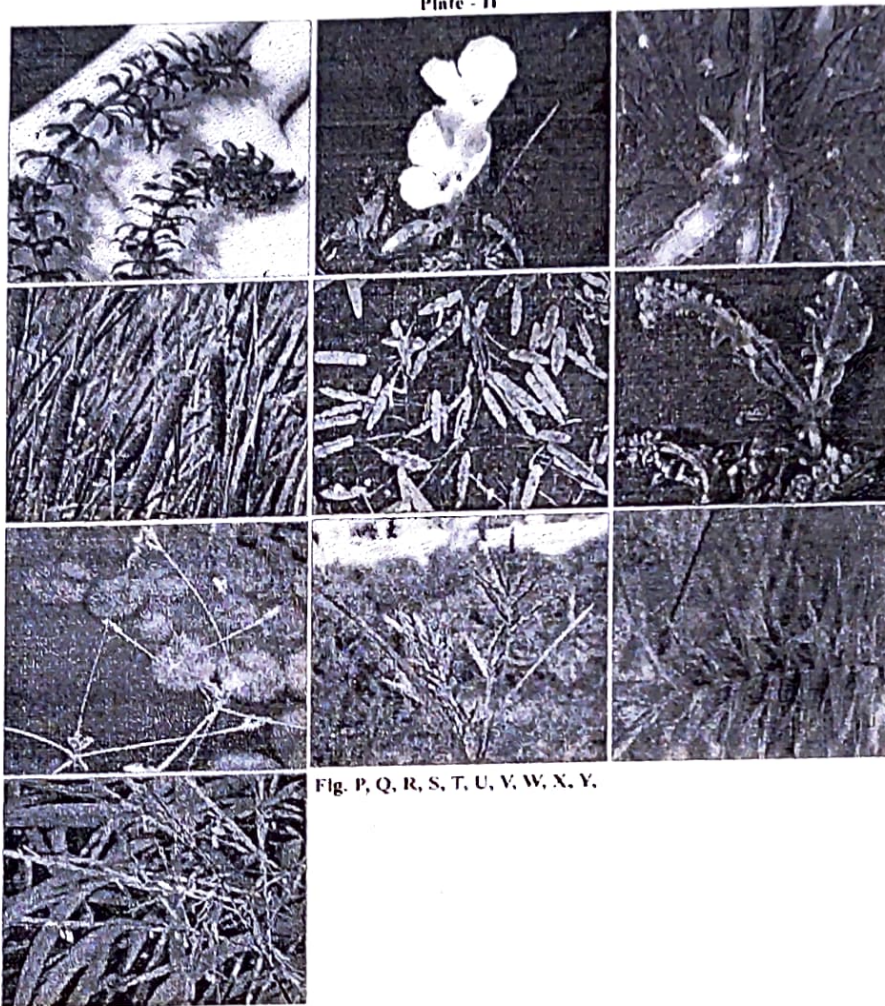
Oryza rufipogon Griff. Notul. 3: 5. 1851. Lakshmin in Sharma *et al.* Fl. Maharashtra St. Monocot. 545. 1996, *Jangli Bhat. (Poaceae) Plate-II, Y.*

Herbs. Leaves: 15-30x0.8-1cm, linear, fat, scabridly hairy. Panicles effuse. Spikelets: scabrid, pale green, 7-8mm long; awns scabrid, pale brown. *Exsiccata*: SAS; 9146

Fls. & Frts.: Sept.-Oct.

Locality: Upper Dudhana

Plate - II



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१४. ग्रंथालय संगणकीकरण: एक अभ्यास

डॉ. अनिल महादू चौधरी

ग्रंथपाल, नर्मदाबाई नागो चौधरी महाविद्यालय, कुसुंबा, ता. जि. धुळे.

सार

ग्रंथालय संगणकीकरण ग्रंथालय शास्त्राचा एक अति महत्त्वाचा समजला जाणारा भाग होय. आजच्या घडीला प्रत्येक ग्रंथालय हे संगणकीकरणाच्या वाटेवरती आहेत. ग्रंथालय संगणकीकरण करण्यामागील ग्रंथालयाचे अनेक हेतू आहेत. त्यामध्ये कमीत-कमी वेळामध्ये जास्तीत जास्त सेवा उपभोक्त्यांपर्यंत पोहचविणे, ग्रंथालयाचा आणि वाचकांचा वेळ वाचविणे, उपभोक्त्यांपर्यंत अचूक सेवा पुरविणे, ग्रंथालयामधील तालीकीकरण, वर्गीकरण, व्यवस्थापन, ग्रंथोपस्कार, ऑर्डरिंग, ग्रंथ निवड, ग्रंथ देव-घेव, ऑनलाईन बुक्स/जर्नल/थिसेस/न्युज पेपर यांचा लाभ उपभोक्त्यांना करून देणे इ. या संशोधन पेपरमध्ये वरील प्रमाणे अभ्यास करण्याचा प्रयत्न करण्यात आलेला आहे.

शोधसंज्ञा: ग्रंथालय संगणकीकरणे, ग्रंथालय संगणकीकरणचा इतिहास, ग्रंथालय संगणकीकरणाचे गुण/दोष, ग्रंथालय संगणकीकरणाची गरज.

प्रस्तावना

माहिती संप्रेषण तंत्रज्ञान आजची एक अतिशय महत्त्वाची गरज आहे. आज प्रत्येक जन हा इलेक्ट्रॉनिक वातावरणामध्ये वावरत आहे. आज घडीला प्रत्येकाच्या कामामध्ये किंवा प्रत्येक कामामध्ये संगणकाचा उपयोग मोठ्या प्रमाणावर होत आहे. आज प्रत्येक क्षेत्रामध्ये संगणकाचा वापर होत आहे. त्यामध्ये बँकींग, रेल्वे, कृषी, व्यापार इ. क्षेत्रामध्ये मोठ्या प्रमाणात संगणकाचा वापर होत आहे. मग यापासून ग्रंथालय तरी कसे पाठीमागे असेल. आज घडीला ग्रंथालयामध्ये मोठ्या प्रमाणावर संगणकाचा वापर होत आहे. ग्रंथालयातील कोणत्याही प्रकारचे काम असो हे संगणकामार्फत केले जात आहे. त्यामध्ये व्यवस्थापन, तालीकीकरण, कर्किरण, ग्रंथ मागणी, ग्रंथ आरक्षण, कर्मचारी व्यवस्थापण, खाते संभाळणे, पगारी करणे इत्यादी प्रकारची कामे मोठ्या प्रमाणावर संगणकामार्फत होत आहेत. ग्रंथालय संगणकीकरणातूनच ई-लायब्ररी, ई- पुस्तक, ई - नियतकालीक, ई - प्रबंध, ई - वृत्तपत्र, ई-शब्दकोश, ई-नियतकालीक, ई-विश्वकोश यासारख्या सेवाही ई स्वरूपात ग्रंथालयामधून पुरविल्या जात आहेत. ग्रंथालय संगणकीकरणासाठी बाजारपेठेमध्ये अनेक प्रकारचे ऑनलाईन, ऑफलाईन सॉफ्टवेअर उपलब्ध आहेत. त्यामध्ये SOUL 2.0, OPAC, Genesis G4, Koha ILS, OPALS, MODERN LIB,



LIBERO, LPT:One, LIBSYS7, LIBRARIAN, Bibliotheca, E-Prints, Journal Finder अशा प्रकारचे काही ग्रंथालय संगणकीकरणाची सॉफ्टवेअर आहेत.

ग्रंथालय संगणकीकरण

ग्रंथालय संगणकीकरण ही एक ग्रंथालयामधील किंवा ग्रंथालय शास्त्रामधील अति महत्वाची बाब आहे. ग्रंथालय संगणकीकरणाशिवाय आजची ग्रंथालये हे वाचकाना किंवा उपभोक्त्यांचा चांगल्या प्रकारची सेवाच प्रदान करू शकत नाही. अशी धारणा काही ग्रंथालयाची होत आहे. पण हेही तितकेच खरे ग्रंथालय संगणकीकरणाशिवाय वाचकांना कमी वेळेमध्ये जास्तीत जास्त, अचूकपणे सुविधाच देवू शकत नाहीत. याविषयी थोडक्यात पाहू. प्रथम ग्रंथालय संगणकीकरण म्हणजे काय आणि ते कशा प्रकारे केले जाते किंवा ग्रंथालय संगणकीकरण करण्यासाठी कोणकोणत्या गोष्टी आवश्यक आहेत आणि ग्रंथालय संगणकीकरण करण्यासाठी पैसा, मनुष्यबळ, यंत्रसामुग्री कीती प्रमाणामध्ये आणि कोणत्या प्रकारची लागेल ही माहिती असणे किंवा याविषयी प्रशिक्षण घेणे अति महत्वाचे आहे.

ग्रंथालय संगणकीकरण म्हणजे काय ?

“ग्रंथालयातील दररोज केली जाणारी कामे ही संगणकाच्या साहाय्याने करणे म्हणजेच ग्रंथालयातील व्यवस्थापण, तालीकीकरण, वर्गीकरण, ग्रंथ मागणी, ग्रंथ आरक्षण, कर्मचारी व्यवस्थापण, खाते सांभाळणे, पगारी करणे ही कामे ग्रंथालय कर्मचाऱ्याकडून करून न घेता सॉफ्टवेअरच्या साहाय्याने संगणकाद्वारे करणे होय.”

ग्रंथालय संगणकीकरणाचा इतिहास

१९३० च्या दशकात यु.एस सेंसस ब्यूरोच्या हरमन होलेरिथ यांनी ग्रंथालय संगणकीकरणाचे प्रथम प्रयत्न सुरु केले. त्यांना पेंडेड कार्ड टेक्नोलॉजीचा शोध लावला. १९३५ मध्ये डॉ. राल्फ एच. पार्कर यांनी हॉलेथिक पंच केलेले कार्ड किंवा आय.बी.एम चे पंच कार्ड वापरून ऑस्टीन येथील टेक्सास विद्यापिठात एक संचलन नियंत्रण प्रणाली तयार केली. तथापि, संगणक प्रणालीच्या विकासाच्या मंद प्रगतीमुळे लायब्ररी संगणकीकरण प्रणालीच्या प्रायोगिक लायब्ररी संगणकीकरण प्रणालीच्या प्रायोगिक प्रकल्पात अनेक सुधारणा करण्याचे प्रयत्न केले गेले.

लायब्ररी तालिकीकरण तयार करण्यासाठी डेटाबेस तयार करण्यात आला आणि त्याच्यासाठी संगणकाचा वापर करून १९६०मध्ये ग्रंथालयच्या संगणकीकरणाचा पहिला प्रयोग विकसित करण्यात आला. लायब्ररी ऑफ काँग्रेसने एम. ए. आर. सी. इनपूट फॉर्मटचा वापर करून त्याच्या होलिंगच्या रेकॉर्डची वाचनीय मशीन तालीकीकरण तयार केली. १९६७ मध्ये OCLC(ऑनलाईन संगणक ग्रंथालय केंद्र) प्रथम संगणक आधारित लायब्ररी नेटवर्क सुरू केले गेले. १९७० च्या सुमारास एकात्मिक संगणक चिप आणि स्टोरेज डिव्हाइसेसच्या



विकासामुळे लायब्ररी संगणकीकरणाचा स्फोट झाला. या दशकात अनेक ग्रंथालयांनी संगणकाचा वापर करून ग्रंथालय संगणकीकरण सुरू केले. १९९० च्या दशकात संगणक जाळ्यांचा उदय झाला. तेव्हा अनेक ग्रंथालयांनी याचा वापर करून मोठ्या प्रमाणावर वाचकांना किंवा उपभोक्त्यांना सेवा देण्यास सुरुवात केली. त्यावेळेस विशिष्ट प्रकारचे ग्रंथालयीन संगणकीकरणाचे सॉफ्टवेअर्स बाजारपेठेत उपलब्ध होती. तांत्रिक प्रगतीमुळे ग्रंथालयांनी माहिती प्रदान करण्यासाठी जगभरातील संगणक एकमेकांना जोडणे सुरू केले गेले. १९७० च्या दशकात सुरू केलेल्या काही विशेष ग्रंथालयामध्ये ग्रंथालय संगणकीकरण प्रणालीमध्ये नवीनतम तंत्रज्ञान बारकोड तंत्रज्ञान, डिजिटल लायब्ररी आणि आर. एफ. आय. डी सुरक्षा प्रणाली आहे.

ग्रंथालय संगणकीकरणाची गरज

आज प्रत्येक क्षेत्रामध्ये संगणकाचा उपयोग फार मोठ्या प्रमाणात होतो. त्यामध्ये बँकींग, कृषी, व्यवस्थापन, विज्ञान, संशोधन, सेवाक्षेत्र आणि सर्वात महत्वाचा उपभोग म्हणजे शिक्षण क्षेत्रामध्ये मोठ्या प्रमाणावर होत आहे. आणि शिक्षण क्षेत्राचाच एक भाग म्हणून ग्रंथालये ओळखली जातात. ग्रंथालयामध्ये संगणकाचा वापर करणे ही आजच्या काळाची एक अति महत्वाची गरज आहे. कारण ग्रंथालय हा विभाग असा आहे की, त्यामध्ये प्रत्येक शिक्षणासाठी संबंधित ग्रंथ, नियतकालीके, प्रबंध, लेख, ऑडिओ/व्हिडीओ सी. डी. पुस्तक, हस्तलिखिते, अनेक प्रकारचे रेफरन्स बुक्स इत्यादी प्रकारचे वाचन साहित्य हे ग्रंथालयामध्ये असते. आणि ते साहित्य कमीत कमी वेळेमध्ये वाचकांना देणे, वाचकांचा आणि ग्रंथालय कर्मचाऱ्यांचा वेळ वाचविणे, नवीन पुस्तकांची मांडणी करणे, पुरातन साहित्य स्कॅन करून जतन करणे, रेकॉर्ड सांभाळणे, वाचकांच्या नोंदी ठेवणे, CAS/SDI सेवा देणे, कर्मचाऱ्यांच्या नोंदी ठेवणे, ऑनलाईन पेमेंट करणे इत्यादी कामासाठी ग्रंथालय संगणकीकरणाची गरज असते.

ग्रंथालय संगणकीकरणाचे फायदे

ग्रंथालय संगणकीकरणामुळे ग्रंथालयांना अनेक प्रकारचे फायदे झालेले आहेत. ते खालील प्रमाणे सांगता येतील.

१. ग्रंथालय संगणकीकरणामुळे झालेला सर्वात महत्वाचा फायदा म्हणजे वेळ वाचतो. वेळ हा प्रत्येकाच्या आयुष्यातला सर्वात महत्वाचा घटक असतो आणि वेळेचे महत्त्व हे विद्यार्थी जीवनामध्ये फार महत्वाचे असते. म्हणूनच प्रत्येक ग्रंथालयाचा एकच उद्देश असतो की कमीत कमी वेळेत जास्तीत जास्त सेवा वाचकांना देणे होय.



३. ग्रंथालयीन संगणकीकरण करण्यासाठी ज्या इलेक्ट्रॉनिक साधणांची आणि सॉफ्टवेअरची आवश्यकता असते ते खरेदी करण्यासाठी खूप पैसा मोजावा लागतो. आणि काही ग्रंथालये एवढा खर्च करू शकत नाहीत. आणि शिक्षण संस्थाही अशा ग्रंथालयांना खरेदी करण्याची परवाणगी देत नाहीत. त्यामुळे हा एक दोष सांगता येतो.
४. ग्रंथालय संगणकीकरणामुळे ग्रंथालयातील प्रत्येक काम हे संगणकाद्वारे केले जाते. आणि असे काम करण्यासाठी संगणकाचे ज्ञान असणे आवश्यक असते. पण काही कर्मचासऱ्यांना अजुनही संगणक हाताळता येत नाहीत. त्यामुळे याचा संपूर्ण भार हा ग्रंथपालावर येवून पडतो.
५. ग्रंथालय संगणकीकरणामुळे संपूर्ण वाचण साहित्याचे वर्गीकरण, तालिकीकरण झालेले असते. एखादे पुस्तक शोधण्यासाठी विद्यार्थ्यांना अनेक त्रासाला सामोरे जावे लागते. कारण प्रत्येक विद्यार्थ्याला ग्रंथालय सॉफ्टवेअर हाताळता येतेच असे नसते. कारण हे सॉफ्टवेअर ग्रंथालयशास्त्रांचे विद्यार्थ्यांचे हाताळू शकतात. इतर विद्यार्थ्यांना त्या विषयी प्रशिक्षण देणे आवश्यक असते.
६. ग्रंथालय संगणकीकरणामुळे ग्रंथालयातील संपूर्ण वाचन साहित्य, महत्वाच्या नोंदी, बिलींग, अकाउंटची संपूर्ण माहिती ही संगणकीकृत झालेली असते. जर मेन सरोवर सॉफ्टवेअर क्राफ्ट झाले, चोरीला गेले, जळाले किंवा त्यांच्या सोबत कोणतीही वाईट घटना घडली तर त्या ग्रंथालयाचे फार मोठ्या प्रमाणावर नुकसान होवू शकते.

सारांश

ग्रंथालयाचे संगणकीकरण करणे आणि संगणकाद्वारे वाचकापर्यंत सेवा पुरविणे हे आजकालच्या ग्रंथालयाचे एक प्रकारचे ध्येय झालेले आहे. आज प्रत्येक ग्रंथालय हे संगणकीकरणाच्या वाटेवर आहेत, मग ते कोणत्याही प्रकारचे ग्रंथालय का असेना. आज घडीला शालेय ग्रंथालय, महाविद्यालयीन ग्रंथालय, विद्यापिठीय ग्रंथालय, विशेष ग्रंथालय, सार्वजनिक ग्रंथालय अशा अनेक प्रकारचे ग्रंथालये हे संगणकीकृत होत आहेत. आज कालच्या शैक्षणिक संस्थेचे ही एकच ध्येय तयार झालेले आहे. ते म्हणजे ग्रंथालयाचे संगणकीकरण करणे. ग्रंथालयाचे संगणकीकरण करण्यामागील आणखी एक हेतू असतो आणि तो म्हणजे NAACमुल्यांकन. NAACकमीटी कडून ग्रंथालयासाठीही मार्क देण्यात येतात. त्यामुळे ग्रंथालय संगणकीकरण करणे ही एक अतीशय महत्वाची बाब बनलेली आहे.



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१. संगणकाचा इतिहास एक सिहांवलोकन

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सांयश

संगणकाचा जन्म कसा झाला त्याचा विकास, कसा होत गेला, त्याचा वापर कोणकोणत्या कामासाठी केला गेला, कोणी व कोठे कोणत्या कामासाठी संगणकाचा वापर करण्यात आला. दुस-या महायुद्धाच्या काळात अमेरिकेमधील मुर स्कूल ऑफ इलेक्ट्रिकल इंजिनिअरींग मध्ये अतिजलद संगणकाचा जन्म होणे त्यामध्ये विविध आज्ञावलीचा समावेश संगणकाच्या चार पिढ्या यांचा ऊहापोह तसेच संगणकाच्या भाषा निर्मिती त्या भाषेचा विकास व संगणकाचे महाजाळे म्हणजेच नेवर्किंगची सुरुवात वेगवेगळ्या प्रकारचे नेटवर्किंग यांचा विकास इ.

प्रस्तावना

अंकगणितातली आकडेमोड : सुलभतेने करण्यासाठी बनवण्यात आलेल्या गणनयंत्रांची परंपरा खूप जुनी आहे. याची सुरुवात 'अबॅकस' या साधनाद्वारे इ.स.पूर्व ३००० ते इ.स.पूर्व २७०० या काळात मेसोपोटेमियात (आजचा इराक) झाली असावी. या अबॅकसमध्ये खाचांत बसवलेले दगडगोटे पुढेमागे सरकवून आकडेमोड केली जायची. या पारंपरिक पध्दतीतील एक मोठा बदल म्हणजे सतराव्या शतकाच्या सुरुवातीस जॉन नेपियरने वापरात आणलेली लॉगॅरिदमची पध्दत. या आकडेमोडीसाठी तक्त्यांचा आधार घेतला जातो. याच सुमारास विल्यम ऑघट्रेड याने 'स्लाइट रूल' हे यांत्रिकी गणनयंत्र बनवले. या साधनातील पट्ट्यांवर पुढेमागे सरकवून, विविध संख्यांच्या लॉगॅरिदमच्या बरीज - वजाबाकीद्वारे त्याचे गुणाकार - भागाकार केले जातात.

सन १८२१ मध्ये चार्ल्स बॅबेज या ब्रिटिश वैज्ञानिकाला, खगोलशास्त्रातली गणिते करताना त्यासाठी एका स्वयंचलित यंत्राची कल्पना सुचली. त्यातूनच त्याने 'डिफरन्स इंजिन' ची आखणी केली. नावाप्रमाणेच दोन संख्यांमधल्या फरकावर हे यंत्र आधारलेले होते. पुनःपुन्हा बॅबेज - वजाबाकी करून गुणाकार - भागाकार करण्याची पध्दत बॅबेजने या यंत्रासाठी मुचवली होती. गियरच्या मदतीने चक्रे फिरवून यात संख्यांची आकडेमोड केली जाणार होती. मात्र सन १८३४ मध्ये बॅबेजने त्याच्या डिफरन्स इंजिनाच्या संकल्पनेला बाजूला ठेवले आणि तो त्याहीपेक्षा प्रगत अशा 'अॅनालिटिकल इंजिन' च्या संकल्पनेवर तो काम करू लागला. बॅबेजने आखलेले हे अॅनालिटिकल इंजिन म्हणजे ख-या अर्थाने कोणत्याही कामासाठी वापरला जाऊ शकणारा संगणकच होता. साठवण्यासाठी वेगळी मेमरी (स्टोअर) आणि गणिते करण्यासाठी वेगळे अॅरिथमॅटिक अँड लॉजिकल युनिट (मिल) होते आणि या यंत्राला प्रोग्रामिंग करायची सोयही होती.

बॅबेजने जरी डिफरन्स इंजिनचा आणि अॅनालिटिकल इंजिना आगखडा बनवला असला, तरी खूप प्रयत्न करूनही त्याला तो प्रत्यक्षात आणता आला नाही. अगदी अलीकडे म्हणजे २००२ मध्ये, वैज्ञानिकांना सतरा वर्षांच्या मेहनतीनंतर, बॅबेजच्या आखणीप्रमाणे असलेले आणि चालू शकणारे डिफरन्स इंजिन बनवण्यात यश आले. लंडन सायन्स म्युझियममध्ये उभ्या असलेल्या या डिफरन्स इंजिनाची लांबी सुमारे सव्वातीन मीटर, उंची दोन मीटर आणि वजन पाच टन आहे. दुर्दैवाने वैज्ञानिकांना बॅबेजच्या आगखड्यातील अॅनालिटिकल इंजिन आजही तयार करता आलेले नाही, पण त्यासाठी त्यांचा प्रयत्न मात्र चालू आहे.

इलेक्ट्रॉनिक संगणक

दुस-या महायुद्धाच्या काळात अमेरिकेतील 'भूर स्कूल ऑफ इलेक्ट्रिकल इंजिनीअरिंग' मध्ये मॉंचली आणि एकर्ट या द्वयीने एका अतिजलद गणनयंत्राला - संगणकाला - जन्म दिला. या संगणकाचे नाव हांतें 'एनिअॅक' ! लष्करी कारणांसाठी बनवला गेलेला हा एनिअॅक संगणक, जगातील पहिला इलेक्ट्रॉनिक संगणक होता. यापूर्वीचे संगणक कप्पी, दंतचक्रे अशा यांत्रिक भागांचा वापर करून गणिते सोडवत असत. परंतु एनिअॅक आपली आकडेमोड ही संपूर्ण इलेक्ट्रॉनिक यंत्रणेद्वारा करत असे. महायुद्धाच्या समाप्तीनंतर १५ फेब्रुवारी १९४६ गेजी अधिकृतरीत्या हा संगणक राष्ट्राला अर्पण करण्यात आला.

इलेक्ट्रॉनिक संगणकातील विविध आज्ञावलीची अंमलबजावणी ही त्यातील विद्युत मंडलांच्या वेगवेगळ्या प्रकारच्या संयोजनाद्वारे (कॉम्बिनेशन) घडून येते. आज्ञावलीतील प्रत्येक आदेशानुसार संगणकातील विविध विद्युत मंडलांची उघडझाप केली जाऊन, त्याद्वारे आज्ञावलीचे पालन केले जाते. विद्युत मंडले नियंत्रित करण्यासाठी या एनिअॅक संगणकामध्ये सुमारे अठरा हजार निर्वात नळ्या (व्हॅक्यूम ट्यूब) सत्तर हजार रेझिस्टर, दहा हजार कॅपेसिटर, सहा हजार स्विच, दीड हजार रिले इत्यादी इलेक्ट्रॉनिक भागांचा समावेश होता. चाळीस पॅनेलने बनलेल्या या संगणकाने सुमारे १२० चौरस मीटर जागा व्यापली होती. हा संगणक सेकंदाला सुमारे पाच हजार बॅरजा करू शकत होता. या संगणकाची विजेची गरज होती सुमारे १६० किलोवॉट. निर्वात नळ्यांचे मूलभूत तत्व हे उष्णतेमुळे उत्सर्जित होणा-या इलेक्ट्रॉनवर आधारलेले असल्यामुळे या संगणकात प्रचंड उष्णता निर्माण होत असे.

त्यानंतर १९५० च्या दशकात निर्वात नळ्यांना अर्धवाहकांचा (सेमिकंडक्टर) उपयोग केलेल्या ट्रांझिस्टरचा पर्याय उपलब्ध झाला, त्यामुळे संगणकांचा आकार लहान झाला आणि संगणकाची दुसरी पिढी जन्माला आली. या ट्रांझिस्टरमधील इलेक्ट्रॉनच्या उत्सर्जनचा उष्णतेशी संबंध नसल्याने वातानुकूलनाची गरजही संपली. १९५८ साली इंटिग्रेटेड सर्किटचा शोध लागल्याने एका छोटयाशा इलेक्ट्रॉनिक चिपवर हजारो ट्रांझिस्टर बसवता येऊ लागले. इंटिग्रेटेड सर्किटमुळे संगणकाची तिसरी पिढी निर्माण होऊन, आता ट्रांझिस्टरचा आकार तर आणखी लहान झालाच, परंतु आकडेमोडीचा वेगही मोठया प्रमाणात वाढला. यानंतर १९७१ सालापामून 'व्हॅरी लार्ज स्केल इंटिग्रेटेड सर्किट' या यंत्रज्ञानाचा वापर सुरू होऊन, एका चिपवर अक्षरशः लाखो ट्रांझिस्टर बसवता येऊ लागले. यामुळे संगणकाचा चौथ्या (म्हणजेच आजच्या) पिढीत प्रवेश झाला.

संगणकाच्या भाषा

संगणकाकडून आज्ञापालन करून घेण्यासाठी त्याला देण्याच्या आज्ञा या त्याला समजणा-या भाषेतून घाव्या लागतात. संगणकाचे आज्ञापालन हे त्याच्याकडील हजागे-लाखां विद्युत मंडलांच्या उघडझापेद्वारे होते. विद्युत मंडलांना उघडझाप करण्याचे आदेश ज्या भाषेद्वारे दिले जातात. ती भाषा 'शून्य' (म्हणजे बंद) आणि 'एक' (म्हणजे चालू) या दोनच आकड्यावर आधारलेली द्विमान (बायनरी) भाषा असते. त्यामुळे संगणकाला पुरवायची आज्ञावली हीसुद्धा संपूर्णपणे द्विमान (बायनरी) भाषेत लिहावी लागते. सन १९४६ साली कार्यान्वित झालेल्या पहिल्या 'एनिअॅक' या संगणकाला सुरुवातीच्या काळात ही द्विमान आज्ञावली थेट वायरिंगमध्ये बदल करून पुरवावी लागत असे. त्यामुळे दोन आज्ञावलींच्या वापराम्यान काही आटवड्यांचा काळ जाई. एनिअॅकचा वापर सुरु झाल्यानंतर सुमारे दोन वर्षांनी मात्र, 'आयबीएम' कंपनी निर्मित कार्ड रीडरमध्ये घातलेल्या कार्डाद्वारे संगणकाला ही आज्ञावली पुरवली जाऊ लागली. शून्य आणि एक यांपासून बनवलेली ही आज्ञावली कार्डावर, टंकलेखनाच्या यंत्राद्वारे विवक्षित ठिकाणी पाडलेल्या छिद्रांच्या स्वरूपात लिहिली जात असे. छिद्राचा अभाव म्हणजे 'शून्य' तर छिद्राचे अस्तित्व म्हणजे 'एक' संगणक या छिद्र पाडलेल्या कार्डांचे आपल्याकडील संवेदकांद्वारे वाचन करू लागला.

शून्य आणि एक या आकड्यांचा वापर करणारी ही भाषा 'मशीन लॅंग्वेज' म्हणून ओळखली जाते. ही भाषा जरी संगणक समजू शकत असला, तरी संगणकासाठी या भाषेत संपूर्ण आज्ञावली लिहिणे हे जिकिरीचे काम आहे. हे काम सुलभ होण्यासाठी अल्पावधीतच वैज्ञानिकांनी 'असेम्ब्ली लॅंग्वेज' चा शोध लावला. सर्वसाधारण संगणकतज्ज्ञांना सहज समजू शकणारी ही असेम्ब्ली भाषा 'असेम्ब्लर' भाषेची एक मर्यादा ही आहे की, संगणकाच्या प्रत्येक प्रकारानुसार या असेम्ब्ली भाषेत फरक असतो. त्यामुळे आता आशा भाषेची गरज निर्माण झाली होती, की जी संगणकावर अवलंबून नसेल. १९५७ साली 'फोर्ट्रान' या सर्वांना सहजपणे समजेल तसेच संगणकावर जी अवलंबून नसेल अशा, पहिल्या भाषेची निर्मिती झाली. कम्पायलर सॉफ्टवेअरद्वारे या भाषेचे रूपांतर संगणकाला समजू शकेल अशा भाषेत केले जाऊन संगणक ही आज्ञावली यशस्वीरीत्या अमलात आणू लागला. फोर्ट्राननंतर 'कोबॉल', 'बेसिक', 'सी प्लस' अशा अनेक भाषांची गरजेनुसार निर्मिती होऊन संगणक क्षेत्र भाषासमृद्ध झाले.

संगणकांचे महाजाळे

इंटरनेट म्हणजे जगभर पसरलेल्या अनेक संगणकांना जोडून त्यांचे एक भलेमोटे वैश्विक जाळे (नेटवर्क) बनवणारे तंत्रज्ञान, या जाळ्यातील संगणक माहितीची एकमेकांत देवाण-घेवाण करतात. मॅसेच्युसेट्स विद्यापीठातील जॉसेफ लिंकलाइडर या संगणकतज्ज्ञाने १९६२ साली मांडलेल्या 'गॅलेक्टिक नेटवर्क' च्या संकल्पनेनुसार माहितीची ही देवाण-घेवाण जागतिक स्तरावर, आणि तीही कुठल्याही संगणकांकडून होण अभिप्रेत होते. त्या काळी एका संगणकावरून दुस-या संगणकावरील माहिती ही एकसंध स्वरूपात दूरध्वनीच्या लाइनवरून पाठवली जात असे. ही माहिती पाठवताना अनेक वेळा संपर्क खंडित होऊन माहिती पाठवण्यास पुन्हा पहिल्यापासून सुरुवात करावी लागायची. या अडचणीतून जन्म झाला तो छोटया 'पॅकेट' च्या स्वरूपात

डेटा पाठवण्याच्या कल्पनेचा. डेटाच्या प्रत्येक छोट्या पॅकेटमध्ये पाठवणा—याचे नाव ज्याला पॅकेट पाठवायचे त्याचे नाव आणि त्या पॅकेटचा क्रमांक इतकी माहिती त्या पॅकेटबरोबर आवश्यक असणार होती. पॅकेटच्या क्रमांकांमुळे, ही माहिती ज्याला पाठवली त्याला ती माहिती व्यवस्थित जुळवलेल्या क्रमाने मिळू शकणार होती त्यामुळे माहितीच्या प्रक्षेपणात खंड पडला तरी अडचण येणार नव्हती.

‘अर्पानेट’ या नावे ओळखल्या गेलेल्या या जाळ्यातला पहिला संगणक कॅलिफोर्निया (लॉस एंजलिस) विद्यापीठात होता, तर दुसरा संगणक स्टॅनफर्ड विद्यापीठात होता. २९ ऑक्टोबर रोजी या जाळयाद्वारे पहिला संदेश कॅलिफोर्निया विद्यापीठातून स्टॅनफर्ड विद्यापीठात पाठवला त्यानंतर एका महिन्यातच कॅलिफोर्निया (बार्बरा) विद्यापीठातील आणि येथे विद्यापीठातील संगणकही या जाळयात सामील झाले. जाळयाचा विस्तार होऊ या संगणकीय जाळयातूनच वैयक्तिक स्तरवरील पहिला संदेश ईमेल १९७२ साली पाठवला गेला. १९७२ साली इंग्लंड युनिव्हर्सिटी कॉलेज ऑफ लंडन आणि नॉवेच्या रडार एस्टॅब्लिश संस्थांचे संगणक अर्पानेटमध्ये सुरुवात झाल्याने, या जाळयाला जागतिक स्वरूप येण्यास सुरुवात झाली. साली टेलिनेट ही व्यावसायिक स्वरूपाची सुरु होऊन व्यावसायिक स्वरूपाचे अस्तित्वात आले. सर्न या युरोपीय संगणक संस्थेने १९९१ साली आपल्या ‘वर्ल्ड वाइड वेब’ या जाळयाची सर्वसामान्यांना ओळख करून त्यानंतर एका दशकातच या सर्व जाळयांनी एकत्रितपणे महाजाळयाचे स्वरूप धारण केले. १९९५ सालापासून हे महाजाळे ‘इंटरनेट’ म्हणून ओळखले जाऊ लागले.

संदर्भ सूची

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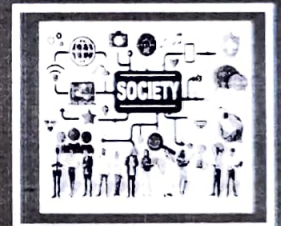
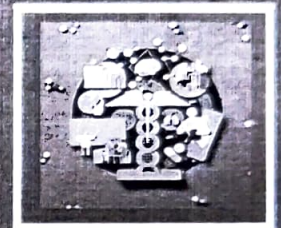
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Role of Academic social networking sites in Information communication: A Study

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Abstract :

Academic social networking site focuses on building and reflecting of social networks or social relations among people, students, Researcher, Professor who share interests or activities. Academic Social networking sites essentially consist of a representation of each user, his/her Academic social links, and a variety of additional services as the increase in popularity of social networking is on a constant rise, new uses for the technology are constantly being observed. At the forefront of emerging in academic social networking sites is the concept of real time and location based. Real time allows users to contribute content, which then broadcasted as it is being uploaded – the concept is similar to live television broadcasts. In this research paper, only selected social networking sites and the role of these sites in information communication have been studied in this research paper.

Key Word : Definition, Selected Academic Networking Sites, Role of Social Networking Sites in Information Communication :

Introduction :

Academic Social Networking is a medium that helps many students, Researchers, professor, and academic professional areas feels as though they belong to a community, religion, institution etc. Due to the increased popularity of it, Professors, researchers and professionals are questioning whether research is being affected by how much time is being spent on these sites? Academic Social Networking became popular in between 2008 to update. The recent trends and developments in Information and Communication Technology (ICT) have changed the information seeking scenario in the digital era. A few years ago the Internet was providing very limited set of services such as searching, browsing, emailing, chatting and so on. But at present it has become more essential part of our day to day life. It is facilitating new services to the users of various areas.

Definition :

The generative definition of a social network site (SNS) was proposed by boyd and Ellison in 2007:

“We define social network sites as web-based services that allow individuals to:

- (1) construct a public or semi-public profile within a bounded system,
- (2) articulate a list of other users with whom they share a connection, and
- (3) view and traverse their list of connections and those made by others within the system.” (boyd and Ellison, 2007, p.211).

Selected Academic Networking Sites :

Academia.edu

Academia.edu, established by Richard Price in 2008, is a networking site purely dedicated to academics. This platform allows users to create personal profiles, follow and exchange messages with relevant fellow users, upload papers, request feedback and track measure papers' engagement/influence through analytics.

ResearchGate

ResearchGate was founded in 2008 by Ijad Madisch, Horst Fickenscher, and Sören Hofmayer. It is an academic social networking where researchers network, connect and share knowledge by uploading journal articles, conference papers, posters, data and code to an online repository.

Penprofile

Penprofile is an academic social networking that fosters global (social) interactions among academics/scholars, students and educational organizations with a view to causing enormous diffusion of knowledge growth and development. It is open to everyone, and it presents a variety of useful features for networking and productivity.

LinkedIn

LinkedIn a networking platform where individuals and companies connect for purposes of fostering working relations, employment opportunities, skills acquisition, and knowledge sharing, etc. Although LinkedIn accommodates all professions, it has proven over time to be a viable platform for academic scholars.



Google Scholar

Google Scholar is a search engine dedicated finding scholarly resources. It allows users search across a wide range of academic literature drawing on information from journals, professional societies, university repositories, institutional libraries, and other scholarly websites. After creating a Scholar profile, users can save their articles in Scholar Library and also import their citations. Google Scholar has Citations feature which provides a simple way for authors to keep track of citations to their articles.

Role of Social Networking Sites in Information Communication :

Management of an online persona:

The first and most important component of a digital social network is the personal profile, which includes particulars such as name, photo, and other identifying information that the user elects to upload. In ASNS, the platform provides, in addition to these details, a place where the researcher may present his or her professional experience, ideas, and capabilities, including the number of citations and downloads of his or her articles, thereby cultivating an online identity and promoting his or her professional reputation. (Barbour & Marshall, 2012).

Diffusion of studies:

The platform provides a place where account holders can upload articles to the cybersphere. It also sends direct e-mail alerts to interested users whenever a new article in a field that they define as of interest to them is published. Two mechanisms exist for this purpose. One is active: members of the network choose to follow authors of their acquaintance or those whose research topics are of interest to them. The other is passive: the network itself proposes (via the site and the user's e-mail address) new articles for the user to follow, either by authors associated with the user's area of interest or those who belong to a circle of direct contacts such as a shared institution or department. In this manner, knowledge about a new article rapidly reaches the community that takes an interest in its topic and, accordingly, may be read (Espinoza Vasquez & Caicedo Bastidas, 2015).

Collaboration:

As the academic research field has become networked and collaborative in recent decades, it has been argued that one-person research has virtually disappeared (Veletsianos & Kimmons, 2013). The ability of digital technology to bridge distances encourages cross-disciplinary and cross-border collaborations. Some scholars argue that academic social networks replicate, and in certain cases even improve, the experience of social activity at a conference by helping to create and expand researchers' professional networks (Curry, Kiddle, & Simmonds, 2009; Kelly, 2013). The two networks discussed in this study provide tools (e-mail and internal messaging systems) for direct communication and presentation of details for the establishment of personal relations among researchers.

Information management:

Veletsianos (2013) suggests that ASNS serve as a source for the collection and organization of personal academic information including ideas, drafts, and anything else that a researcher on the network gleans from articles, references, and citations. Due to this characteristic, an academic social-network site may be seen as a collaborative information-management system (Bullinger, Hallersted, Renken, Soeldner, & Möslein, 2010). Some scholars do not accept this statement; indeed, while both networks, Academia.edu and ResearchGate, provide tools for publication and for the tracking and organization of publications; they are not designed for the management of citations.

Measurement of impact:

Academic impact is measured in terms of the number of citations of an article and the quality of the journals in which the article appears. Online academic networks offer additional metrics, such as number of persons who read or download an article (Gruzd, Staves, & Wilk, 2011; Ovadia, 2013).

Conclusion :

The present study concludes that today, academic social networking sites have become one of the largest platforms for the teaching and learning communities to share and experience the real time information for personal as well as for academic purposes to connect and expand their professional network. They should use certain academic social networking sites like academia.edu, Penprofile, Research Gate, Google Scholars, LinkedIn. In this research paper, as above, only selected social networking sites and the role of these sites in information communication have been studied in this research paper.

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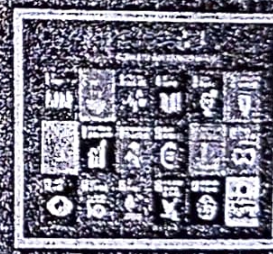
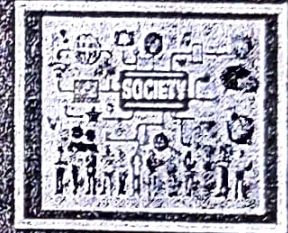
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A Geographical Study of Negatives Impact on Tourism in Padmalaya Hindu Temple, Erandol, Jalgaon District

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Abstract

The famous temple of Padmalaya Hindu Tourism, impacts of negatives fall into main categories. Environmental impacts affect the carrying capacity of the area, vegetation, and air quality, bodies of water, the water table, wildlife, noise pollution, land pollution, water pollution, air pollution and natural phenomena. It is the socio-cultural impacts are associated with interactions between people with differing cultural backgrounds, attitudes, and behaviors, and relationships to material goods. It is estimated that about 1771024 of the total visitors to various tourist destinations are Annual Local, State and National Tourist Arrivals with the visit to Padmalaya Hindu temple in very beautiful surrounding area, lake, Lotus Flower, Small water fall, green trees and hilly area.

KEYWORDS—Tourism, Padmalaya Lotus Flower

Objectives

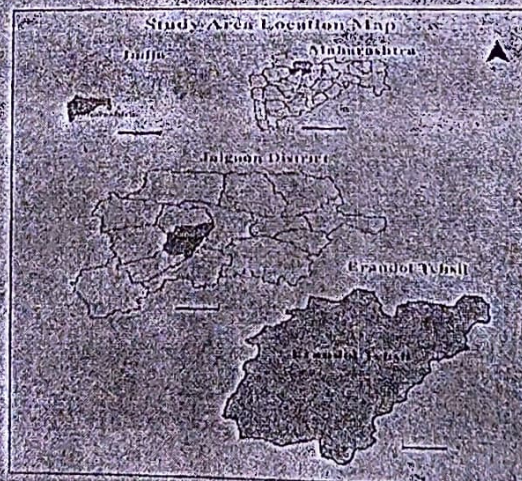
1. To study the negative impact of tourism in Padmalaya Temple.

Methodology

The current study is based on the secondary data of Padmalaya Hindu temple office collected to the related people data. The data has been procured from the related articles, research papers, reports and the government of India.

Study Area

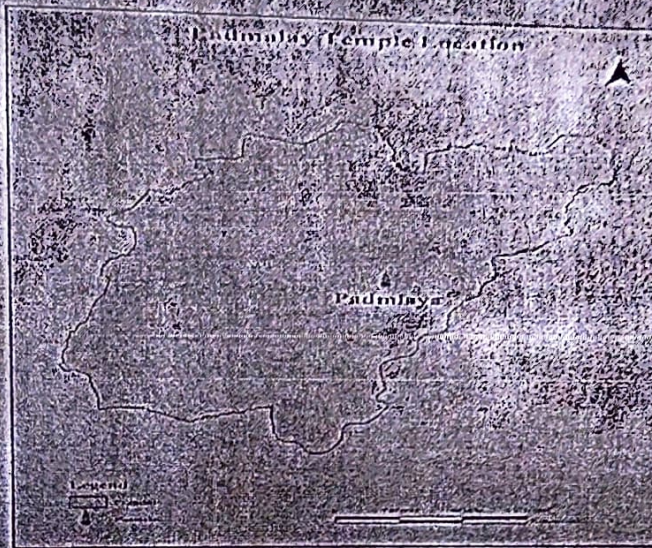
Padmalaya is a great old temple in the Indian state of Maharashtra. Padmalaya temple located is 20.869345° N and 75.392532° E. It lies 12 km from Erandol and 31.5 km from the district headquarters of Jalgaon. The Jalgaon district is located at the north-west corner of the state of Maharashtra. Jalgaon district is one of the central points of Erandol taluka, Erandol East side located 12 km. Padmalaya Hindu temple are hilly area and greenable part in forest area in padmalaya tourist point. Northern part of the district is occupied by Satpuda Mountain and Southern part is by Ajanta hills. Padmalaya temple surrounding area is very beautiful. Total parts of the greenable and hilly area. The climate of this district is generally dry except in the monsoon. The average annual rainfall in the district is 740.7 mm. December is the coldest month with the mean daily minimum temperature at 11.9 degree C. and the mean daily maximum at 29.8 degree C. Temperatures begin to rise steadily from about the beginning of March and by May the hottest month of the year the mean daily maximum temperature very hot reaches 42.5 degree C.



Map No. 01

INTRODUCTION

The popular tourist point attraction in Jalgaon district is the famous Padmalaya temple. It attracts a lot of supporter. Day to day visited people is very happy and new people visit to it. There are also various other places to see in Jalgaon district one of the places for a very peaceful and a very peaceful ambience making it a perfect picnic spot. Padmalaya is a Hindu temple in the Indian state of Maharashtra. It lies 12 km from Erandol and 11.5 km from the district headquarters of Jalgaon. Padmalaya, a portmanteau word blending "Padmasya" and "Alaya" means "Home of Lotus" in Sanskrit. The name is derived from a large lotus pond that is believed to be adjacent to a local temple dedicated to Ganesha. Other places of interest in the village are Kunda, a peculiarly shaped pond, and the Amant river, located around 1 km from Padmalaya. Padmalaya is one of the Saade-teen (three and a half) Shree Ganapati Peeth in India.



Map No. 02

This place is known as one peeth. Padmalaya is blessed with the two Swayambhu Ganesha idols in the sanctum, named Siddhivinayaka and Riddhivinayaka. Two (Swayambhu) Ganesha idols are there. These idols were "Swayambhu" literally meaning "self-existent". The temple is built using stone. It is the large pond beside the Padmalaya Hindu temple. This pond used to be full of pink and a white lotus flower is very beautiful. Hence the place got the name of "Padmalaya".

Classification of Tourist Destinations

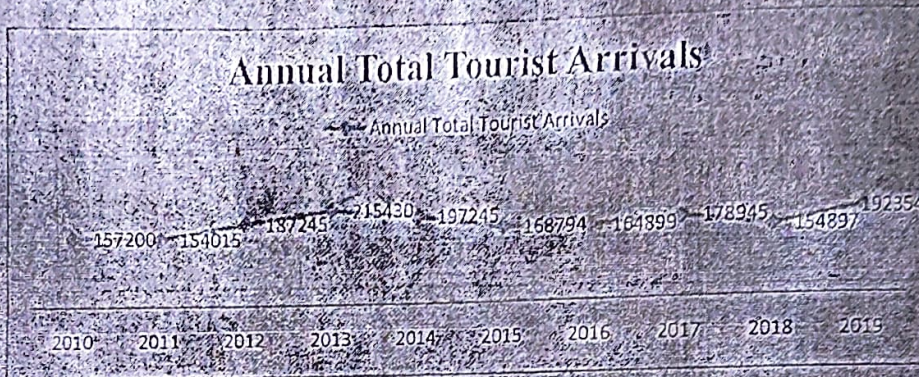
It is estimated that about 1771024 of the total visitors to various tourist destinations are Annual Local, State and National Tourist Arrivals with the visit to Padmalaya Hindu temple in very beautiful surrounding area, lake, Lotus Flower, Small water fall, green trees and hilly area. The maximum numbers of visitors are made to Padmalaya Hindu temple in the percentage of Annual Total Tourist Arrivals in 2013 (12%). The minimum numbers of visitors are made to Padmalaya Hindu temple percentage of Annual Total Tourist Arrivals in 2010-2011, 2015, 2016 and 2018 (9%). The negatives impact of Padmalaya Hindu temple and surrounding area.

Estimated Annual Tourist Arrivals in Tourist Visits of Padmalaya temple in Erandol taluka, Jalgaon District 2010-2019

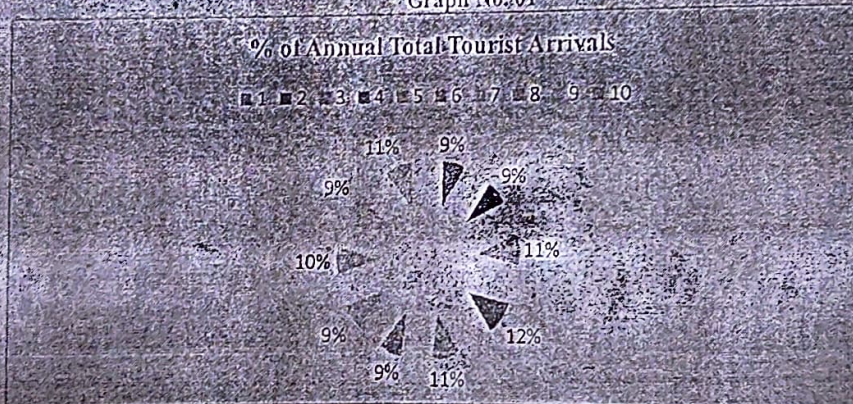
S. No.	Years	Annual Total Tourist Arrivals	% of Annual Total Tourist Arrivals
01	2010	157200	9%
02	2011	154015	9%
03	2012	187245	11%

04	2013	215430	12%
05	2014	197245	11%
06	2015	168794	9%
07	2016	164899	9%
08	2017	178945	10%
09	2018	154897	9%
10	2019	192354	11%
11	Total	1771024	100%

Table No. 01



Graph No. 01



Graph No. 02

Negative Impacts of Padmalaya Tourism

Tourism impacts the wildlife, vegetation, air quality, the quality and supply of water, natural phenomena, Environmental, human health, water pollution, noise pollution, air pollution, land pollution, solid wastes, and Social event are very dangerous.

Pollution: When huge numbers of people visit, they invariably burden the transportation system and contribute to pollution locally and globally. This Padmalaya temple surrounding area is much polluted like air, water, noise, land and soil pollution.

Environmental Damage:

Padmalaya temple is very beautiful surrounding area but the tourist people is very dangerous work because natural parts are damage. Many tourist activities have negative ecological impacts. Snorkeling, hiking, and fishing all affect and deplete the local scenery. Too many tourists can have a negative impact on the quality of life.

Economic impacts:

The economic contribution of tourism is feeling in equally direct and indirect ways, where direct economic impacts are created when commodities like the following are selling: accommodation and entertainment, food and beverages services, and retail opportunities. Residents, visitors, businesses, and various levels of governments (municipal to federal) all influence direct tourism impacts through their spending in or near a given tourism area.

Socio-cultural impacts of tourism:

While tourism can help preserve cultures, it can also water them down via commercialization and cookie-cutter approaches. It is advertising has attacked the sameness of hotels, suggesting local state and national level people's homes in real Padmalaya region as an alternative. An natural aspect of visiting the attractions pleases is the looking for of authenticity, the desire to knowledge a different cultural location in its Padmalaya surrounding area.

Conclusion-

This place is known as one peeth, Padmalaya is blessed with the two Swayambhu Ganesh idols in the sanctum, named Siddhivinayaka and Riddhivinayaka. Two (Swayambhu) Ganesh idols are there. These idols were "Swayambhu" literally meaning "self-existed". It is the large pond beside the Padmalaya Hindu temple. This pond used to be full of Pink and a White-lotus flower is very beautiful. Hence the place got the name of "Padmalaya". It is estimated that about 1771024 of the total visitors to various tourist destinations are Annual Local, State and National Tourist Arrivals with the visit to Padmalaya Hindu temple in very beautiful surrounding area. Lake, Lotus Flower, Small water fall, green trees and hilly area.

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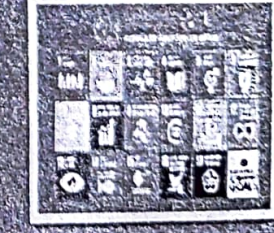
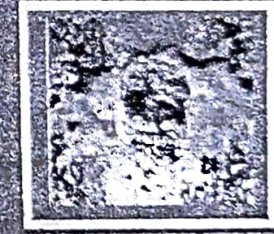
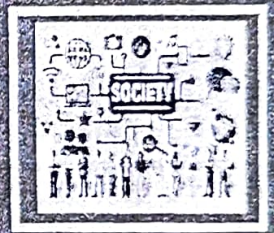
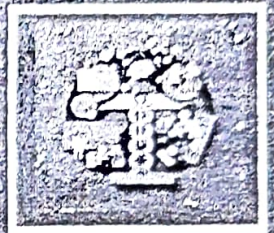


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A Geographical Assessment Of padmalaya Temple As Tourism Center In Jalgaon District

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Abstract

Padmalaya temple is situated 12 km away from Erandol in Jalgaon district of Maharashtra. The temple has scenic natural surroundings of the mountain. 'Padmalaya' in Sanskrit means "Home of Lotus." Padmalaya is considered among the two and a half 'Shree Ganapati Peeth'. Padmalaya Hindu temple is only one temple in India, because the relation in Mahabharata (Pandya). The 2010-2019 total ten years 1,771,024 tourist visit to the Padmalaya temple because Local Tourist (85%), State Tourist (11%) and National Tourist (4%).

Keywords - Tourist, Tourism, Padmalaya, Pandava.

Objectives - The main objective of the present study is to assess the Padmalaya temple as tourism center.

Methodology

The present study is based on the secondary data collected by the Padmalaya temple office. The data has been procured from the related articles, research papers, reports and the government of India. Some data has been furnished from the website of the Ministry of Tourism and Culture for the Government of Maharashtra. Collected data is presented in tabular form and also presented with the help of bar graphs.

Study Area

Padmalaya is a great old temple in the Indian state of Maharashtra. Padmalaya temple located is 20.869345° N and 75.392532° E. It lies 12 km away from Erandol and 31.5 km from the district headquarter Jalgaon. The Jalgaon district is located at the north-west corner of the state of Maharashtra. It has the Dhule district in the west, Madhya Pradesh in the north, Buldhana in the east and Aurangabad in the south. The district headquarter is Jalgaon which is connected to major towns of Gujarat and Maharashtra through broad gauge rail. The nearest airport is at Aurangabad which is 150 kms away. Padmalaya is a town in the Indian state of Maharashtra. It lies 12 km from Erandol and 31.5 km from the area central station of Jalgaon.



Map No. 01

Erandolis one of the central points of Jalgaon district, from Erandol towards East side located 12km. away Padmalaya temple is located in hilly and forest area. Northern part of the district is occupied by Satpuda Mountain and Southern part is by Ajanta hills. The central part is occupied by Tapi river fertile agricultural prosperous area. The total forest area of the district is 1707 Sq kms which is almost 17% of the total geographical area of the district.

Climate and Rainfall

Padmalaya temple surrounding area is very natural and beautiful surrounded by green hills. The climate of the district is generally dry except in the monsoon. The average annual rainfall in the district is 740.7 mm. December is the coldest month with the mean daily minimum temperature at 11.9°C and the mean daily maximum at 29.8°C. Temperatures begin to rise steadily from about the beginning of March and by May, the hottest month of the year, the mean daily maximum temperature very hot reaches 42.5°C. The highest maximum temperature recorded at Jalgaon was 47.3°C.

Introduction

When we think about tourism, we might perceive tourism as people who travel to a particular place for visiting the attractions, visiting friends and relatives, taking a vacation, and spending a good time. We even believed tourism as a person who spends their leisure time engaging with various tourism-related activities, such as sunbathing, sports, touring, etc. Besides, tourism is not just a global holiday or air travel. When you think about tourism, many ideas might come to mind. Thus, tourism includes a wider concept. It includes a visit to hill stations, snow-covered hills, beaches, or a long journey, etc. In addition, it also incorporates people who travel for conferences, research, seminars, business-related activities, etc. These travelers use all forms of transport and various tourism facilities such as rail, cruise ships, airlines, etc. Tourism phenomenon is closely connected with the abiotic, biotic, human, economic, social and cultural components of the environment.

Tourism, more than any other field of activity, is dependent on the environment, because it represents the main resource and tourist attraction factor on which depends the development of various tourism activities and its quality and components, this way facilitating, inhibiting and even hindering their development. Correlative analysis of the resultant state of the environment, tourist facilities and division components of tourist travel can guide to approximation induced negatives and positives impacts, which may be of a natural-physical, economic, and social. The negatives and positives impact of financial control is achieved through an appropriate strategy and management, information, monitoring of the environment and the tourism phenomenon, applying and sectored research, etc.

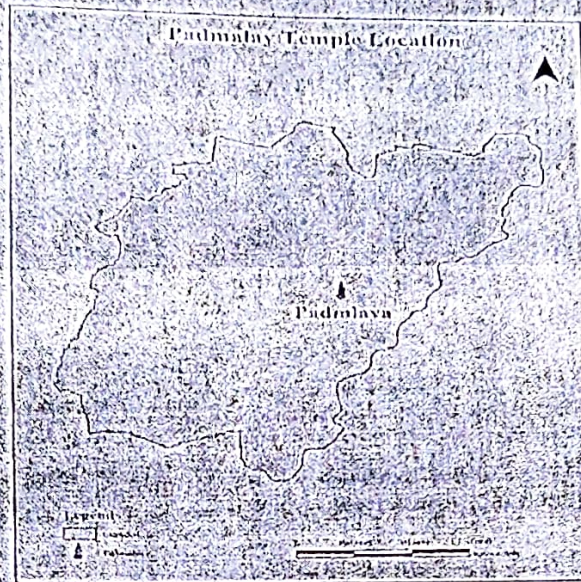
The popular tourist attraction in Jalgaon district is the famous Padmalaya temple which people come to see from all over the world. It is famous Padmalaya temple in Erandol taluka which attracts a lot of devotees. Day to day visited people are very happy and new couple visit to mostly. There are also various other places to see in Jalgaon district, one of the places has a very cool climate and a very peaceful ambience making it a perfect picnic spot. The other tourism places in the district include the Parola Fort, which belonged to the Great Rani Laxmibai's father, Patnadevi where the great scientist Bhaskaracharya was born. The famous Swinging Towers, of Farkande is another mesmerizing construction to be seen in Jalgaon. The speciality of these towers is that when one of the tower is waved the other starts waving naturally. Another holy place is the Unapdev hot-water body which had been touched by Lord Rama at the time of his exile from Ayodhya. Valjhan is the place which has the "Samadhi Sthal" of Walmik Rishi. The other holiday places of the city include the Suki dam, Pitalkhore near Chalsigaon, Shirsoli Lake and the Kusumba Goshala. It is an amazing place to be visited by tourists heaped with exquisite temples, forts, waterfalls and many beautiful villages. We are here to provide you with best travel guide which is bound to make your trip remarkable.

Padmalaya Temple

Padmalaya is a Hindu famous temple in the Indian state of Maharashtra. It lies 12 km from Erandol and 31.5 km from the district headquarters of Jalgaon. 'Padmalaya', a portmanteau word blending "Padmasya" and "Alaya", means "Home of Lotus" in Sanskrit. The name is derived from a large lotus pond that is believed to have existed adjacent to a local temple dedicated to Ganesha. Other places of interest in the village includes "Bhimkunda", a peculiarly shaped pond, and the Anjan river - located around 1 km from Padmalaya.

Padmalaya is one of the *Saade-teen* (three and a half) 'Shree Ganapati Peeth' in India. This place is known as one peeth. Padmalaya is blessed with the two Swayambhu Ganesh idols in the

sanctum, named Siddhivinayaka and Riddhivinayaka. Two (Swayambhu) Ganesh idols are there. These idols consisted of Coral (Praval). One idol has its trunk (Sond) curving to the right and the other to the left.



Map No. 02

These idols were "Swayambhu" literally meaning "self-existent". The temple is built using stone. A large pond beside the temple. This pond used to be full of lotus flowers. Hence the place got the name of "Padmalaya".

This temple is located at the top of a hill. Small temples are on all sides of the main temple. The padukas of Shree Govind Maharaj are located in front of the temple. A huge bell weighing 440 kg is next to the padukas.

Bhinkund -

According to legend, the warrior Bhim has a battle with Rakshas Bakasur and kills him. Bhim was thirsty after the fight so he hit his elbow very forcefully on the ground to form a small pond of fresh water. The place is called Bhinkund and is near the Padmalaya temple. Bhinkund is a beautiful place with lots of herbs and medicinal plants around the vicinity of Padmalaya temple reservoir.

Pandava -

At the time of vanavas Pandavs stayed in Erandol (ancient name was Ekchakranagari). They built a palace with lacquer. This is called Pandavvada and is believed to have many secret routes leading to nearby forests. This Pandavvada was later burned by kaurav to kill Pandavs. The remains are in Erandol city.

Classification Of Tourist By Destinations

Jalgaon has a range of places of interest which can serve as tourist destinations to local, District, state and National tourists. A large number of these sites are important as local tourist destinations and have been attracting local visitation during weekends and during Specific days of religious importance. It is estimated that about 1771024 of the total visitors to various tourist destinations are Local Tourist with Jalgaon district Tourist is 85%, State Tourist is 11%, National Tourist is 04% visit to the Padmalaya temple in very beautiful surrounding area and green trees, hilly area. The maximum numbers of visits are made to Padmalaya temple in the district 2013 (215430).

The maximum numbers of Local Tourist (District) visits are made to Padmalaya temple in the district 2019 (88%). The minimum numbers of Local Tourist (District) visits are made to Padmalaya temple in the district 2010 (78%).

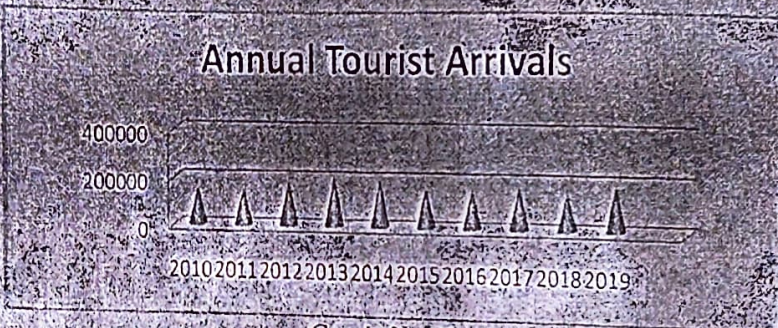
The maximum numbers of State Tourist (District) visits are made to Padmalaya temple in the district 2013 (15%). The minimum numbers of State Tourist (District) visits are made to Padmalaya temple in the district 2018 (08%).

The maximum numbers of National Tourist (District) visits are made to Padmalaya temple in the district 2010 (08%). The minimum numbers of National Tourist (District) visits are made to Padmalaya temple in the district 2015 (02%) and 2019 (02%).

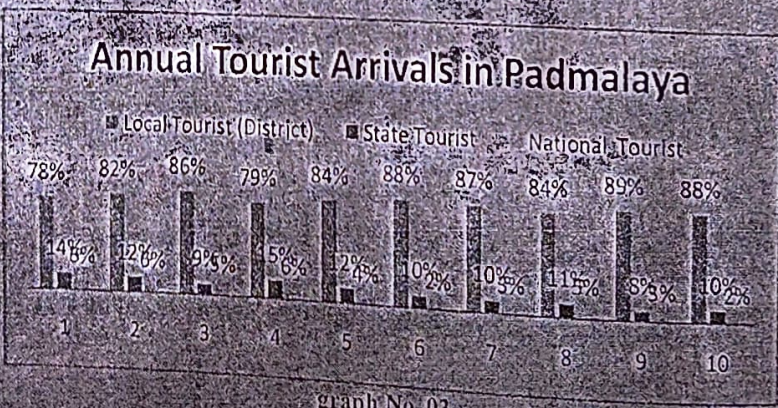
Table No. 01 Annual Tourist visited to Tourist Destinations, Padmalaya temple 2010-2019

S. No.	Years	Annual Tourist Arrivals	Local Tourist (District)	State Tourist	National Tourist
01	2010	157200	78%	14%	08%
02	2011	154015	82%	12%	06%
03	2012	187245	86%	09%	05%
04	2013	215430	79%	15%	06%
05	2014	197245	84%	12%	04%
06	2015	168794	88%	10%	02%
07	2016	164899	87%	10%	03%
08	2017	178945	84%	11%	05%
09	2018	154897	89%	08%	03%
10	2019	192354	88%	10%	02%
11	Total	1771024	85%	11%	4%

Source - Padmalaya temple record 2010 to 2019



Graph No.02



Graph No.03

Conclusion -

The Padmalaya had very long history back to Mahabharata. It is important to note that all local, district, State and National level tourist visits to the Padmalaya Ganesh temple. The facilities available at the Padmalaya are not suitable for the national level tourist. The local tourist and National level tourist is increased.

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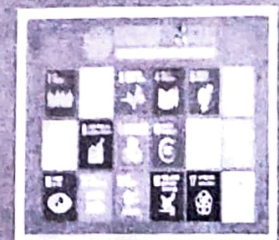
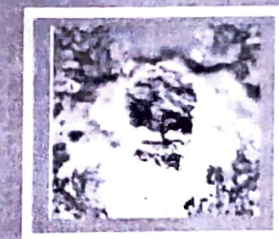
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Rural Development in Jalna District

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Abstract: -

The process of urbanization is one of the important aspects of the development and change. The different urbanization levels reflect different degrees of economic development. In fact, high urbanization is regarded as one of the indicators of development. The metamorphosis which occurred in European countries during the last century transition from preponderantly rural to urban countries has been occurring in third world countries in this century. Urbanization is a dynamic process both spatially and temporally. For the present study Jalna district has been considered for the study.

Keywords: -

Urbanization, Road & Transport, Industries, Horticulture, Water Facility

Introduction: -

The process of the urbanization may be observed in all the countries of the modern world with the differences in the rate or speed by which they are being urbanized. Being a global wonder and the growth of urban centres, the present era sometimes mentioned to as 'Age of Urbanization'. There might be difference of opinion whether the present age may be considered as an age of urbanization or not, yet figures do confirm the fast growth of urbanization all over the world. Concerning urbanization in these areas, strongly support industrial development through the realization of agglomerative economies. Rural folks have been using modern implements in agriculture, small industries, trade and commerce, infrastructural facilities etc. educational and technological development have totally changed the shape of rural society. Further, rural people have been availing employment opportunities in urban areas. They are well aware about all amenities and opportunities in urban areas which may be availed by rural people.

Significance of the Problem: -

In the present research paper selected impact of urbanization on rural development in Jalna district. In Jalna city, face a number of additional challenges alongside with high population growth rates in respect of urbanization. In Jalna, a wide range of economic, demographic, social, political and natural factors commonly affect the rural development. Moreover, lack of regulations, laws, public awareness, information and professional capacity, are common factors negatively affecting the rural development.

Statement of the Problem: -

Over the last two decades or so, the whole world has experienced rapid changes and socio-economic transformations. The socio-economic changes affected and caused severe stress mainly in isolated, peripheral and rural areas of the world. It is obvious from the above that the need of rural areas for socio-economic development and regeneration along with the need for diversification of their economic base so as to meet the changes is today greater than ever. In that sense, rural areas promising industry and one of the main sectors that national and local governments support and promote as a vehicle for revitalization of the rural areas.

Scope and Limitations: -

In the present research work selected impact of urbanization on rural development in Jalna district. This study is useful and scope for those who have interested doing research in Rural geography.

Objectives of the Study Area: -

1. To study the existing socio-economic characteristics of urbanization and its relationship with rural development.
2. To identify factors responsible for encouraging as well as restraining the urbanization process and rural development.
3. To analyse the shifts in the rural-urban linkages in agricultural production, employment generation, income earnings, consumption and investment patterns and saving potential etc.

Hypotheses: -

1. Urbanization leads to adopt improved technology in agricultural development in rural areas.
2. Urbanization promotes employment opportunities in rural areas.

Research Methodology: -



Research Methodology mentions to set of principles and processes by which aims and objectives are apparent. The General and Geographical information of Jalna district was collected from Government Gazetteer and Census Handbook of 1991, 2001, 2011 and official website of Jalna district. For the present study To include the tahsil wise data socio-economic abstract of Jalna district (1991-2011) were considered. Field survey was carried out to collect the primary data

Review of Literature: -

Various studies have been conducted by scholars on urbanization and rural development based on primary as well as secondary data urbanization and rural development
Upadhyaya (1980)

presented a critical analysis of efforts made in the in the implementation of Five-Year Plan regarding rural development and emphasized on integrated rural development

Shrivastava (1978)

attempted to explore the methodological approach to integrated rural development in India. Further the author presented socio-economic, sociocultural and ecological factors by which integrated development system can be implemented.

Location: -

Jalna district lies in the Marathwada region in Maharashtra. The district has eight tahsils. Specifically, district lies between 19° 15' N to 20° 32' N Latitudes and 75° 36' E to 76° 45' E longitude. The boundaries of Jalna district adjacent to Parbhani&Buldhana on east, Aurangabad on west, Jalgaon on north and Beed on south. North to South district length is 150 kms and East to West length is 110 Kms. The census 2011 puts the total population of the district at 19, 59,046. The literacy rate of the district is 71.52% and is among the lowest in the state of Maharashtra. The population density of the district is 254. The area of the district is 7788 Sq. Km.

Climate: -

The climate of the district can be divided into three seasons as: a) Moderately warm wet season during June to Sept., b) Cool dry season from Oct. to Feb., and c) Hot dry season from March to May. The average temperature of the district is ranging from 20°C during winter to 41°C during summer. Rainfall is not uniform in all parts of the district. The average rainfall ranges between 600mm to 700 mm.

Soil: -

The soils of the district are black with considerable variation in texture and depth. They are light, medium and heavy soils. The soils along the river banks especially in Ambad and Partur blocks are deep black and quite fertile. The soils in northern parts of the district i.e. in Jalna, Bhokardan and Jaffrabad blocks are coarser.

Rivers: -

The most important river in Jalna district is Godavari, which flows for about 60 kms. along the Southern boundary of the district. Its principal tributaries are Dudhana, which flow from Central part of the district and Galhati, which passes through Ambad tehsil. The river Purna, which is one of the tributaries of Godavari flows through the Northern part of the district.

Population: -

as per 2011 Census, the population of the district is 1958483. out of which rural population is 1581251 (80.73%) and urban population is 377232 (19.27%).

Table No-1.1 Sampled Villages and Households

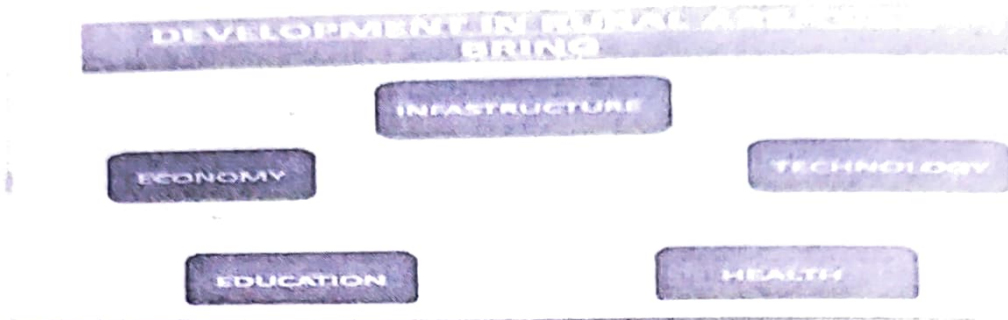
Sr. No.	Sampled Tahsils	No. of Sampled Villages	No. of Sampled Household
1	Badnapur	2	75
2	Ghansavangi	3	85
3	Jaffrabad	2	88
4	Mantha	3	65
	Total	10	310

Source: -Compiled by the Researcher.

Sampling: -



In a micro study, it is very different to select a perfect sample. This problem is generally tackled by selecting some tahsils and villages on random basis. Jalna district. Out of eight tahsils, four have been selected on a random basis. These four tahsils are Badnapur, Ghansavangi, Jafrabad and Mantha etc. These four tahsils have villages and towns consisting of 209675 households (158794 rural and urban 65798 households). The study is based both on primary as well as secondary data. Primary data was collected through field survey.



Infrastructural Related Problem: -

1. Water 2. Electricity 3. Transport 4. Educational Institutions 5. Communication. 6. Health 7. Employment 8. Storage Facility.

Rural Development facilities: -

1. Poultry and Dairy Similarly business. 2. Development of Women and Children in P. Areas. 3. JawaharRozgarYojana. 4. Training of Rural Youth for Self-Employment. 5. Rural Health 6. DalitVastiSudhar and RamaiAwas Yojana. 7. Bharat NirmanAbhiyan. 8. Institutional Sector. 9. Agricultural Finance. 9. Ayushmanbharat. 10. PradhanMantri Gram SadakYojana (PMGSY) 2005. 11. Indira AwasYojana (IAY) 1985-86. 12. Accelerated Rural Water Supply Programme (ARWSP) 1986-90. 13. Mahatma Gandhi National Rural Employment Guarantee Act (NREGA) 2005 Ministry of Rural Development, Government of India.

Table No-1.3 Tahsil wise Rural Development in Jalna district

Sr. N	Tehsils	Houses Constructed (Gov.Sch.)	Water supply Source	Literacy in Percent	Occupation
1	Badnapur	248	Somthana dam	62.04	Average Farmer
2	Ghansavangi	198	Godavari river, well	69.14	Average Farmer
3	Jafrabad	199	Purnariver, well	62.11	Average Farmer
4	Mantha	164	Purnariver, Well	69.31	Average Farmer

Source: -District Socio-Economic Abstract- 2012.

Railways-

The total length of railway line passing through the district is only 88 kms. Manmad-Kachikuda railway line passes through Jalna district. Jalna district is not well connected with the other major cities and hence industrialists as well as the traders are facing the problem of transportation of goods.

Roads; -

The district is having a total road length of 3798 kms. Jalna district has good potentiality of transportation. The Maharashtra State Road Transport Corporation covers almost every village on its routes in the district. Cities like Mumbai, Pune, Aurangabad, Jalna, Beed, Latur, Nagpur, Shegaon, Shirdi, Nasik, Nanded etc. are connected by S.T.

Table No-1.2
Distribution of Road & Transport in Jalna district

Sr. No	Category	Length(km)
1	National Highway(211-NH)	29
2	State Highway	963
3	District Roads	1704
4	Village Roads	779
5	Other Roads	352
	Total	3805



Source: Socio-Economic Abstract, Jalna district (2010).

Air Transport: -

At present, there is no air transport facility available in the district. However, Aurangabad Airport, which is 67 kms. away from Jalna serves the needs of the industrialists and traders.

Horticulture: -

Jalna district is fairly rich in horticulture crops. Horticulture development programmes linked with Employment Guarantee Scheme has been started in the district since 1990-91. The State Government has undertaken a programme to promote horticulture development through establishments of nurseries and granting of capital subsidy to marginal and small farmers.

Irrigation Facilities: -

Water is one of the important resources for the industrial development. There is no major irrigation project in Jalna district. However, an area of about 51710 hectares in Jalna district. There are 7 medium irrigation projects and 46 minor irrigation projects in Jalna district. About 31.08% and 22.89% of the total irrigated area is utilised for cotton and jowar respectively.

Conclusions: -

- Literacy rate of Jalna district is 71.52 percent and males and female's literacy rates is reported 81.53 percent and 6095 percent respectively. (2011)
- There are three villages having population 10,000 and above.
- Mantha Village in Manthatahsil is the most populated (16,865) and Pimpalgaon (sul) village in Bhokardantahsil is the least populated (20 persons).
- Various factors such as education, banking railways, transport and communication, agriculture modernization, availability of all essential items etc. have been considered as main factors are responsible for rural development in Jalna district of Maharashtra.
- Agricultural development in Jalna district has been related to the adoption of new technology and techniques in agriculture, changes in cropping pattern, utilization of high yield variety seeds, chemical fertilizer, better marketing facilities etc.
- It has been observed that Jalna district is the first among the ten fastest growing districts of Maharashtra
- The healthy development of rural industrialization depends on the basic infrastructural facilities such as transport, communication, roads and rail etc, connected with urban areas.

The study revealed that there has been a large-scale industrial development of the district

Solution: - Rural Development Plane., Facilitates cities and villages equally.

Suggestions: -

- Measures may be taken to strengthen the administrative units at the village or the lowest level
- Expand the budget for agriculture, the governmental investment in rural infrastructure and governmental land-use free allocated to rural areas.

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