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2018-19

3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

S.n.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital		
							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list/Scopus/Web of Science/other, mention
1	Understanding farm level innovation and productivity in Mexico using logit regression	Dr Anita Mandloi	Mathematics	International journal of mathematics trends and technology	2018-19	22 31-5 373	<a href="https://www.ijmtjournal.org/">https://www.ijmtjournal.org/</a>	<a href="https://www.ijmtjournal.org/archives/ijmtt-v65i1p511">https://www.ijmtjournal.org/archives/ijmtt-v65i1p511</a>	UGC listed
2	Some fixed point theorems for set valued Mappings in cone b-metric spaces equipped with a partial order	Dr. S.K.Malhotra	Mathematics	Journal of Advanced mathematical studies	2018-19	2065-3506	<a href="https://www.journal.fairpartners.ro/">https://www.journal.fairpartners.ro/</a>	<a href="https://www.fairpartners.ro/upload_poze_documento/files/volume%2012,%20no.%202/2_Malhotra.pdf">https://www.fairpartners.ro/upload_poze_documento/files/volume%2012,%20no.%202/2_Malhotra.pdf</a>	Google Scholar
3	Some coincidence and common fixed point results in cone metric spaces Over Banach Algebras via Weak $g-\phi$ - Contractions	Dr. S.K.Malhotra	Mathematics	transactions of A. Razmadze mathematical institute	2018-19	2346-8092	Transactions of A.Razmadze Mathematical Institute (rmi.ge)	<a href="http://rmi.ge/transactions/TRMI-volumes/173-2/v173(2)-8.pdf">http://rmi.ge/transactions/TRMI-volumes/173-2/v173(2)-8.pdf</a>	Scopus

4	<i>Morphological Physicochemical and preliminary phytochemical evaluation of Nigella sativa L. seed</i>	Dr. Sudhanshudhar Dwivedi	Chemistry	International Journal of applied research	2018-19	2394-7500	<a href="https://www.allresearchjournal.com/">https://www.allresearchjournal.com/</a>	<a href="https://www.semanticscholar.org/paper/Morphological%2C-physicochemical-and-preliminary-of-Rashid-Dwivedi/00af0ba4fd2ea83bf6c38bc90d224f95c97a7c2">https://www.semanticscholar.org/paper/Morphological%2C-physicochemical-and-preliminary-of-Rashid-Dwivedi/00af0ba4fd2ea83bf6c38bc90d224f95c97a7c2</a>	scribd
5	Response of soybean to P and K with and without rhizobium japonicum and phosphorus solubilizing bacteria on nutrients protein and yield sustainability of soybean in	Dr. Aruna Jain	Botany	International journal of pure and applied biosciences	2018-19	23 20-70 51	Indian Journal of Pure & Applied Biosciences - NAAS Rated Journal (ijpab.com)	<a href="http://www.ijpab.com/form/2019%20Volume%207,%20issue%202/IJPAB-2019-7-2-361-363.pdf">www.ijpab.com/form/2019 Volume 7, issue 2/IJPAB-2019-7-2-361-363.pdf</a>	No
6	Influence of P and K with and without rhizobium japonicum and phosphorus solubilizing bacteria on growth and yield sustainability e of soybean in black soil	Dr. Aruna Jain	Botany	International journal of pure and applied biosciences	2018-19	23 20-70 51	Indian Journal of Pure & Applied Biosciences - NAAS Rated Journal (ijpab.com)	<a href="http://www.ijpab.com/form/2019%20Volume%207,%20issue%202/IJPAB-2019-7-2-224-227.pdf">www.ijpab.com/form/2019 Volume 7, issue 2/IJPAB-2019-7-2-224-227.pdf</a>	No
7	Effects of integrated nutrient management on nutrients in eclipta Alba	Dr. Aruna Jain	Botany	journal of emerging technologies and innovative research	2018-19	2349-5162	<a href="https://jetir.org/?gclid=CjwKCAjwh-CVBhB8EiwAjFEPGRitksuP5OntePTokLyy8a4PIUQblkgzLPZygtbEYX5F1AmrzjpCYhoC">https://jetir.org/?gclid=CjwKCAjwh-CVBhB8EiwAjFEPGRitksuP5OntePTokLyy8a4PIUQblkgzLPZygtbEYX5F1AmrzjpCYhoC</a>	<a href="https://www.jetir.org/papers/JETIR1902B57.pdf">https://www.jetir.org/papers/JETIR1902B57.pdf</a>	UGC Approved Journal no 63975
8	Water Quality Assessment of Kaliasote Dam of Bhopal, Madhya Pradesh with reference to its nutrient dynamics	Dr. Mukesh Dixit	Zoology	International Journal of Life sciences Research.	2018-19	2348-313x	International Journal of Life Sciences Research (IJLSR) (researchpublish.com)	<a href="https://www.researchpublish.com/upload/book/Water%20Quality%20Assessment%20of%20Kaliasote-7263.pdf">https://www.researchpublish.com/upload/book/Water%20Quality%20Assessment%20of%20Kaliasote-7263.pdf</a>	scribd
9	Study of Physico-Chemical Parameters and Amphibia Fauna (Annurans) Population of Bhopal Lake and Ponds	Dr. Mukesh Kumar Napit	Zoology	IJCAR International Journal of Current Advanced Research	2018-19	ISSN:0975-833X Vol. 11, (01) pp, 454-456. Jan. 2019	<a href="https://journalijcar.org/international-journal-current-advanced-research">https://journalijcar.org/international-journal-current-advanced-research</a>	<a href="http://journalcra.com/sites/default/files/issue-pdf/34178.pdf">http://journalcra.com/sites/default/files/issue-pdf/34178.pdf</a>	SJIF

10	Study of Amphibia Fauna of Bundelkhand Region with Special Reference to Damoh District.	Dr. Mukesh Kumar Napit	Zoology	<i>IJDR International Journal of Development Research</i>	2018-19	ISSN: 2230-9926 Vol. 09, (02) pp, 25847-25849. Jan. 2019,	Cover Images   International Journal of Development Research (IJDR) (journalijdr.com)	<a href="https://www.journalijdr.com/sites/default/files/issue-pdf/15158.pdf">https://www.journalijdr.com/sites/default/files/issue-pdf/15158.pdf</a>	Semantic Scholar
11	The Effect of Pesticides on Fish Fauna of Bhopal Lower Lake	Dr. Mukesh Kumar Napit	Zoology	<i>EJPMR European Journal of Pharmaceutical and Medical Research</i>	2018-19	ISSN: 2394-3211 Vol.4(2):pp, 733-739 January,2019	<a href="https://www.ejpmr.com">https://www.ejpmr.com</a>	<a href="https://storage.googleapis.com/journal-uploads/ejpmr/article_issue/1551414223.pdf">https://storage.googleapis.com/journal-uploads/ejpmr/article_issue/1551414223.pdf</a>	UGC Listed
12	Study of Fish Fauna of Bundelkhand Region with Special Reference to Damoh District.	Dr. Mukesh Kumar Napit	Zoology	<i>AJST Asian Journal of Science and Technology,</i>	2018-19	ISSN: 0976-3376 Vol.10, Issue ,01, pp.9379-9381, January.2019	WELCOME TO AJST   Journalajst (journalajst.com)	<a href="https://www.journalajst.com/study-fish-fauna-bundelkhand-region-special-reference-damoh-district">https://www.journalajst.com/study-fish-fauna-bundelkhand-region-special-reference-damoh-district</a>	Index copier.

  
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2018-19

# Understanding Firm-Level Innovation and Productivity in Mexico using Logit Regression

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Abstract - The objective of this paper is to explore the nature of firm-level innovation and investments in knowledge capital in Mexico and the link between innovation activities and productivity and employment.

Keywords - Determinants, regression, logit model.

## I. INTRODUCTION

Topics like Prevalence of firm-level innovation in Mexico, type of firms that innovate, main types of knowledge capital investments that firms implement, main determinants and barriers to firm-level innovation and links between innovation activities and productivity or employment are discussed. The data has been collected from World Bank Enterprise Survey.

## II. FINDINGS

	(1)	(2)	(3)	(4)
	R&D per worker	Research per worker	R&D	Research
Two-way traders	0.4795***	-0.0432***	0.1661	-0.0206
Demand(-)	0.5025***	0.6001***	0.1688	0.2101
Share(t-3)	-0.0303***	-0.0070***	-0.0091	-0.0025
Lack Finance	0.0228***	-0.0535***	-0.0046	-0.0173
Telecom_obstacle	-0.0089***	-0.1480***	0.0024	-0.0522
Government_obstacle	0.1092***	0.0249***	0.0367	0.0079
Trade cost-obstacle	-0.0598***	0.0596***	-0.0211	0.0214
Foreign	-1.231***	-0.1179***	-0.4007	-0.0418
Age	-0.0049***	0.0108***	-0.0016	0.0037
Medium	-0.4836***	0.0715***	-0.1529	0.0284
Large	0.3877***	0.3159***	0.1479	0.1149
Constant	9.4470***	9.196***	-2.6571	-3.1717
Observations	181	181	181	181

TABLE 1. KNOWLEDGE INTENSITY FUNCTION

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<http://journal.fairpartners.ro>

## SOME FIXED POINT THEOREMS FOR SET-VALUED MAPPINGS IN CONE $b$ -METRIC SPACES EQUIPPED WITH A PARTIAL ORDER

S.K. MALHOTRA, SARITA PRAKASH AND SATISH SHUKLA

ABSTRACT. In this paper, we prove some fixed point results for set-valued mappings and give an ordered version of the famous Nadler's theorem in cone  $b$ -metric spaces over Banach algebra equipped with a partial order. Our results extend and generalize some known results of metric, cone metric and cone  $b$ -metric spaces.

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Key words and phrases: Cone  $b$ -metric space, fixed point, set-valued mapping, partial order.

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**SOME COINCIDENCE AND COMMON FIXED POINT RESULTS IN CONE METRIC SPACES OVER BANACH ALGEBRAS VIA WEAK  $\psi$ -CONTRACTIONS**

S. K. MALHOTRA<sup>1</sup>, P. K. BHARGAVA<sup>2</sup>, AND S. SHUKLA<sup>3\*</sup>

**Abstract.** Recently, B. Li and H. Huang [20] introduced the notion of weak  $\psi$ -contractions on cone metric spaces over Banach algebras. The purpose of this paper is to generalize the main result of Li and Huang [20] by proving some coincidence and common fixed point results in cone metric spaces over Banach algebras via weak  $\psi$ - $\varphi$ -contractions for weakly compatible mappings. Some examples are presented which verify and illustrate the results proved herein.

1. INTRODUCTION

The notion of metric spaces is generalized by several authors in various directions. One such generalization of metric spaces is a cone metric space given by L.G. Huang and X. Zhang [12]. In usual metric spaces, the metric function  $d$  is defined from  $X \times X$  in the real number system, where  $X$  is a nonempty set. When generalizing the metric spaces to a cone metric space, the metric function  $d$  is defined from the product  $X \times X$  into a Banach space (instead of the real number system). Thus, in cone metric spaces the distance is a vector belongs to the Banach space. Huang and Zhang [12] defined the cone metric spaces and proved some fixed point theorems for various types of contractive mappings and generalized the famous Banach contraction principle [2] in various ways. An example of Huang and Zhang [12] shows that there may be mappings which are contractive in a cone metric space, but fails to be a contraction with usual metric, i.e., the contractive conditions in cone metric spaces are more general, than those in usual metric spaces.

Common fixed point theorems have applications, e.g., in establishing the existence of a common solution for a class of functional equations arising in dynamic programming, in establishing the existence of solution of system of nonlinear integral equations, in establishing the existence of a solution for an implicit integral equation, etc. (see, e.g., [24, 13, 30] and the references therein). G. Jungck [15], introduced a common fixed point theorem for two commuting mappings in such a way that if we take one of them as identity mapping, then we obtain the Banach contraction principle. Although, Jungck's theorem generalizes the Banach contraction principle, but has a drawback that the involved mappings commute. S. Sessa [28] introduced the notion of weakly commuting mappings and weakened

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# Morphological, physicochemical and preliminary phytochemical evaluation of *Nigella sativa* L. seeds

M. Rashid, S. Dwivedi • Published 2019

The present study deals with morphological characteristics, physicochemical factors and preliminary phytochemical screening of *Nigella sativa* (NS) seeds collected from Bhopal region of Madhya Pradesh... [Expand](#)



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Int. J. Pure App. Biosci. 7 (2): 361-363 (2019)

Research Article



## Response of Soybean to P & K with and without *Rhizobium japonicum* and Phosphorous Solubilizing Bacteria on Nutrients, Protein and Yield Sustainability of Soybean in Black Soil

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### ABSTRACT

An experiment was conducted to during kharif season of 2016 and 2017 at Sehore (M.P.). The experiment was laid out in Randomized block design with three replication having Ten treatments viz. Control (T<sub>1</sub>), *Bradyrhizobium japonicum* alone (T<sub>2</sub>), Local check (KRIBHICO-rhizobium culture (T<sub>3</sub>), T<sub>2</sub> + P<sub>60</sub> kg/ha through SSP (T<sub>4</sub>), T<sub>2</sub> + K<sub>30</sub> kg through MOP (T<sub>5</sub>), T<sub>2</sub> + PSB 10 g/kg seed treatment (T<sub>6</sub>), T<sub>2</sub> + P<sub>30</sub> kg/ha + PSB 10 g/kg seed treatment (T<sub>7</sub>), T<sub>2</sub> + K<sub>15</sub> kg/ha + PSB 10 g/kg seed treatment (T<sub>8</sub>), T<sub>2</sub> + T<sub>6</sub> (T<sub>9</sub>) and P<sub>60</sub> kg/ha + K<sub>30</sub> kg/ha (T<sub>10</sub>). The soil at the experimental field was medium black (vertisol) having clay loam texture and 40cms depth. The experimental soil was low in available nitrogen, medium in available phosphorus and medium in available potassium low in available Boron, Molybdenum and Zinc with pH Different growth and yield attributing character of grain and straw yields were studied. On the basis of results obtained on various parameters following summary and conclusions have been drawn out: It was found significantly higher yield and N, P, K, Zn, B & Mo in straw and seed as well as protein content in seed compared to other treatments and control. Application of P<sub>60</sub> kg/ha + K<sub>30</sub> kg/ha (T<sub>10</sub>) as compared to other treatments followed by (T<sub>5</sub> and T<sub>6</sub>), also improved the content of N, P, K, Zn, B and Mo in soil at harvest of soybean.

**Key words:** Soybean, Kharif, Boron, Molybdenum and Zinc

### INTRODUCTION

Soybean [*Glycine max* (L.) Merrill] is one of the important grain legume crop of India, which not only helps in maintaining soil fertility but it is also a rich source of protein

the establishment of processing units and high remunerative prices.

Bhaskar has reported the significant response of FYM @ 2.5 t ha<sup>-1</sup> along with RDF, Zinc, Molybdenum and biofertilizers on



## Influence of P & K with and without *Rhizobium japonicum* and Phosphorous Solubilizing Bacteria on Growth and Yield Sustainability of Soybean in Black Soil

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### ABSTRACT

An experiment was conducted to study during kharif season of 2016 and 2017 at Sehore (M.P). The experiment was laid out in Randomized block design with three replication having Ten treatments viz. Control (T<sub>1</sub>), *Bradyrhizobium japonicum* alone(T<sub>2</sub>), Local check (*KRIBHICO-rhizobium* culture(T<sub>3</sub>), T<sub>2</sub>+ P<sub>60</sub> kg/ha through SSP(T<sub>4</sub>), T<sub>2</sub> + K<sub>30</sub> kg through MOP(T<sub>5</sub>), T<sub>2</sub> + PSB 10 g/kg seed treatment(T<sub>6</sub>), T<sub>2</sub> + P<sub>30</sub> kg/ ha + PSB 10 g/kg seed treatment(T<sub>7</sub>), T<sub>2</sub> + K<sub>15</sub>kg /ha + PSB 10 g/kg seed treatment(T<sub>8</sub>), T<sub>2</sub> + T<sub>8</sub> (T<sub>9</sub>) and P<sub>60</sub> kg/ ha+ K<sub>30</sub> kg/ha (T<sub>10</sub>). On the basis of results obtained on various parameters as per approved synopsis following summary and conclusions have been drawnout: Growth characters such as no. of branches/plant, dry weight/plant, number and dry weight of root nodules attained significantly higher values with the application of P<sub>60</sub> kg/ ha+ K<sub>30</sub> kg/ha (T<sub>10</sub>) as compared to other treatments followed by (T<sub>5</sub> and T<sub>6</sub>). Yield and yield attributing characters such as no. of pods/plant, seed index and seed yield attained significantly higher values with the application of P<sub>60</sub> kg/ ha+ K<sub>30</sub> kg/ha (T<sub>10</sub>) as compared to other treatments followed by (T<sub>5</sub> and T<sub>6</sub>). Number of pods per plant was noted higher in the treatment P<sub>60</sub> kg/ ha+ K<sub>30</sub> kg/ha (T<sub>10</sub>) as compared to other treatments followed by (T<sub>5</sub> and T<sub>6</sub>). Appreciably higher seed index was noted under P<sub>60</sub> kg/ ha+ K<sub>30</sub> kg/ha (T<sub>10</sub>) as compared to other treatments followed by (T<sub>5</sub> and T<sub>6</sub>). Application of P<sub>60</sub> kg/ ha+ K<sub>30</sub> kg/ha

## Effects of Integrated Nutrient Management of Nutrients on Morphological Characters in *Eclipta alba* l.

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Govt. sarojini naidu girls post graduate college Bhopal

### Abstract

*Eclipta alba* is an important medicinal herb found as a weed throughout India. Almost all of its parts are used in traditional system of medicine including seeds, roots and shoots and leaves. Integrated nutrient management refers to maintenance of the soil fertility and plant nutrient supply to an optimum level for sustaining the desired medicinal plant productivity through optimization of the benefits from all possible sources of plant nutrient in an integrated manner. We planned to study the effect of integrated nutrient management of nutrients in *Eclipta alba* with respect to seed germination, morphological characters and reproductive characters in randomized block design with three replications. There were eight treatments, P1: Control (500 : 300 : 300 g NPK per plant through fertilizers), P2: Vermicompost, P3: Biofertilizers, P4: Chemical fertilizers, P5: Biofertilizer+Vermicompost, P6: Biofertilizer+Chemical fertilizer, P7: Chemical fertilizer+Vermicompost and P8: Biofertilizer+Chemical fertilizer+Vermicompost. The observation on plant height, days to flower initiation, days to 50 per cent flowering, percentage seed germination, shoot length and root length were documented to study the effect of treatments and their interpretation. The findings exhibited that the P8 performed best among all treatments. The maximum plant height (39.18 cm), days to flower initiation (30.69 DAS), days to 50 per cent flowering (33.47 DAS), percentage seed germination (97.48%), shoot length (26.47 cm) and root length (28.26 cm) under P8 treatment.

**Key words:** Integrated nutrient management, Biofertilizer, Chemical fertilizer, Vermicompost plant height

### Introduction

When medicinal plants are grown continuously in a piece of land, nutrient supplying capacity of the soil becomes exhausted. So, the nutrient removal by medicinal plants must be replenished through external addition of nutrient elements. But if only chemical fertilizer is applied there may be loss of biological properties of the soil. Nutrient imbalance created by single or combined application of NPK through chemical fertilizers is stated to be the main reason for non sustainable yield. Under good management conditions and adequate supply of biofertilizers and organic manures, the nutrient removal can be replenished and soil physical, chemical and biological properties can be improved. Nutrients added through



## Water Quality Assessment of Kaliasote Dam of Bhopal, Madhya Pradesh with reference to its nutrient dynamics

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**Abstract:** In last few decades ever increasing population and unplanned urbanization have posed serious problems of sewage disposal and contamination of surface waters like lakes, reservoirs, dams, rivers etc. Most of these water resources also get contaminated due to weathering of rocks, leaching of soils etc as natural phenomena, ultimately causing nutrient enrichment in these surface water resources. Land use changes and the increase use of fertilizers in modern agricultural practices with subsequent leaching to watercourses, rivers and lakes, has further increased the risk of eutrophication and loss of biodiversity, finally deterioration in water quality (Pani, 2017). Therefore there has been a growing need for regular water quality assessment to understand the existing status of the water body so as to adopt necessary mitigative and conservation measures for abatement of pollution. Water quality can be assessed by various parameters such as BOD, temperature, electrical conductivity, nitrate, phosphorus, potassium, dissolved oxygen, etc. along with heavy metals such as Pb, Cr, Fe, Hg, etc. which are of special concern because they produce water or chronic poisoning in aquatic animals. Harmful algal blooms are becoming increasingly common in freshwater ecosystems globally. Pollution by plastic debris is an increasing environmental concern in water bodies, where it affects open-water, shoreline and benthic environments (Bhateria and Jain, 2016). Hence keeping this in mind the water quality of Kaliasote Dam which is one of the important Dams of Bhopal was analyzed during the period 2015-2017 to understand the present status of water quality with reference to nutrient enrichment from both the autochthonous and allochthonous sources. The results of various parameters indicate that the water of the dam is moderately polluted and can be used only for domestic and irrigation purposes after treatment as per standard prescribed by CPCB.

**Keywords:** Anthropogenic activities, Pollution, Water Quality.

### 1. INTRODUCTION

Water quality assessment is very important, as the majority of the water used in urban cities comes from surface water. It is the measure of how suitable the water is from a biological, chemical and physical perspective. Water quality can be impacted negatively by both natural and human causes (Dubey, et al. 2011). Physico-chemical parameters like pH, Dissolve oxygen, hardness, nitrates phosphates have direct impact on water quality of any aquatic system. The changes in different parameters have a relationship with the external influence, anthropogenic activities, nutrient loading etc. These physico-chemical parameters have deep and strong relationship with biological parameters as well as the biodiversity of aquatic system.

Thus the assessment of water quality through physico-chemical and biological analysis for understanding the changes in constituents of water is very important as it can reflect directly on the biotic community of the aquatic system. The effects of pollution stress manifest themselves in several ways in the lake biota viz. change in the pattern of distribution, elimination of sensitive strategy, dominance of tolerant species, change in diversity and morphological and physiological changes (Dixit and Pani, 2011).



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### RESEARCH ARTICLE

#### STUDY OF PHYSICO-CHEMICAL PARAMETERS AND AMPHIBIA FAUNA (ANURANS) POPULATION OF BHOPAL LAKE AND PONDS

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#### INTRODUCTION

Bhopal is known as city of lakes, as it is embedded with 18 different lakes and ponds. These wet lands are of absolute importance as they are the good and useful sources to mankind in different ways. Some are used for irrigation, some for potable water supply, raw water supply, recreation, habitat for different amphibians etc. With rapid urbanization, constant changes in demographic structure especially during second half of last century, all these water bodies have been subjected to great environmental stress. This resulted in deterioration of water quality through inflow of sewage, solid waste dumping, other anthropogenic activities thus affecting the biodiversity (Mishra, 2007). The entire surrounding of the water bodies is covered by deciduous forest. A sparsely bushy Jungle also exists at the basin of the reservoirs. Although, the district is rich in having natural water bodies, like lake, Ponds, reservoir and rivers. Very scanty work is available on the fresh water amphibian fauna. These water bodies are main source of water supply, which is utilized for drinking, bathing, washing etc. But now a days, these water bodies are highly polluted due to the Industrial effluents, insecticides, herbicides, weedicides, fungicides and other human activities. Nitrate, Calcium chloride and non soluble Phosphate have increased to alarming level and decomposition of excessive bloom releases the methane and ammonia gases in water.

#### ABSTRACT

All the 18 lakes and ponds in Bhopal District, were studied. The pollutants and drastic environmental variation have also adversely effected and changed water qualities i.e. color, hardness, turbidity, alkalinity, PH, COD, BOD and TDS etc. Aquatic life, thus, also is affected. Changes in morphology of amphibian, like- color, pigmentation, length, weight mass, etc. may occur. This can not be ignored that the afore-mention variation may be responsible to develop new varieties or sub species. Unfortunately, negligible work is done in relation to amphibian fauna of the area in recent-past. Though, appreciable limnology work is done, yet the amphibian fauna remained unexplored. The fauna study is of tremendous significance in determining population density and calculating sub specific diversity and conservation of ecosystem in Bhopal District.

Study of biodiversity of amphibian fauna and their identification, is one of the interesting field of biological research, which gives us an idea about the morphological variation and population diversity of fauna in polluted and non polluted site of any particular habitat.

#### MATERIAL AND METHODS

The water samples were collected during July 2011 to June 2012. The Method of water analysis would be adopted as per APHA standard method. Eleven Physico-chemical parameters were analyzed and Amphibian were grouped accordingly. Amphibian, collected seasonally, from all polluted and non polluted selected sites by hand picking or fishing nets and would be preserved in 5-10% formaldehyde in glass or plastic bottle. Authentic keys for identification and classification of amphibian, would be used. The key for identification of amphibian is available in ZSI (Jabalpur) and Calcutta would be taken. Boulenger; G.A. (1990), the amphibian fauna of British India. Annandale; N. (1918); S.K. Dutta; (1997); etc would be sought for amphibian identification.

#### RESULTS AND DISCUSSION

The present investigation is planned to emphasize of physico-chemical component with fresh water amphibian fauna of





STUDY OF AMPHIBIA FAUNA OF BUNDELKHAND REGION WITH SPECIAL REFERENCE TO DAMOH DISTRICT

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ABSTRACT

The pollutants and drastic environmental variation have also adversely effected and changed water qualities i.e. colour, hardness, turbidity, alkalinity, pH, COD, BOD and TDS etc. Aquatic life, thus, also is affected. Changes in morphology of amphibian, like- colour, pigmentation, length, weight mass, etc. may occur. This can not be ignored that the afore-mentioned variation may be responsible to develop new varieties or sub species. Unfortunately, negligible work is done in relation to amphibian fauna of the area in recent-past. Though, appreciable limnological work is done, yet the amphibian fauna remained unexplored. The fauna study is of tremendous significance in determining population density and calculating sub specific diversity and conservation of ecosystem in Damoh District.

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INTRODUCTION

The Bundelkhand region of north India is encompassed by two states, i.e., M.P. and U.P. Its greater part falls in M.P. covering 5 district viz. Damoh, Sagar, Chhatrapur, Tikamgarh and Panna. Its terrain being rocky has reduced water level, and due to this, the area has much irrigation potentiality. With a view to meet this demand of the region M.P. state irrigation department is giving greater importance to the development of irrigation projects in Bundelkhand region. Accordingly, many major, medium and minor irrigation reservoirs are constructed. Rajnagar lake, Ponds and river's (Kopra, Sunar and Vijayma), are located in Damoh district of M.P. The entire surrounding of the water bodies is covered by deciduous forest. A sparsely bushy jungle also exists at the basin of the reservoirs. Although, the district is rich in having natural water bodies, like lake, Ponds, reservoir and rivers. Very scanty work is available on the fresh water, amphibian fauna. These water bodies are main source of water supply, which is utilized for drinking, bathing, washing etc. But now a days, these water bodies are highly polluted due to the industrial effluents.

insecticides, herbicides, weedicides, fungicides and other human activities, Nitrate, Calcium chloride and non-soluble Phosphate have increased to alarming level and decomposition of excessive bloom releases the methane and ammonia gases in water. Study of biodiversity of amphibian fauna and their identification, is one of the interesting field of biological research, which gives us an idea about the morphological variation and population diversity of fauna in polluted and non polluted site of any particular habitat. Soni and Bais; (1986) Thakur and Sharma; (1986), Swant and Yaddan (1976), and Daniel and Ghatc; (1996), did limnological work on Sagar-Damoh, water bodies and reported some physical and chemical components, Jhingran (1985), described the morphological variation and population density of fish in Bangladesh and Andhra Pradesh, and P.K. Rath and Pant; (1979), reported distribution of fresh water fishes in Madhya Pradesh, but nobody has paid any attention to their correlation with the amphibian fauna.

MATERIAL AND METHODS



THE EFFECT OF PESTICIDES ON FISH FAUNA OF BHOPAL LOWER LAKE

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ABSTRACT

Studies on the toxicity of common pesticides and some industrial pollutants on fishes have been reviewed. Pollutants such as pesticides cause diseases, behavioral abnormalities, cancer and gene mutations in fishes. Physiological malfunction, histological, haematological and biochemical changes have also been observed in fishes. Pesticides significantly affect the early life stages of fishes. Toxic effects of pesticides vary in different organs of the fish. Liver, gill, kidney are tissues that can accumulate high level of pollutants as well as other factors, such as salinity temperature, hardness etc.

KEYWORDS: Bhopal Lower Lake, Fishes, Pesticides, Toxicity.

INTRODUCTION

Industrial waste has long been recognized as serious pollutant of the aquatic environment. Pesticides have toxic effect in exposed organism. The presence of pesticides beyond permissible limits in water has been reported worldwide. Our study focuses on the toxic effect of pesticides on fish.

In lake, steps have been taken to monitoring of pesticides and other pollutants level in water sample. Monitoring of pollutants has been done in the lake. Several national drinking water mission and integrated environment programme on pesticides and other pollutants.

Water samples collected from various sources in different sites of lake were analyzed and pesticides were found within the permissible level. Pesticides concentration in submerged plants and fish at various sites of Lower lake were observed only down stream sites and in fish collected at Lake weir, Lake dam, Lake hills, regions, which was possible due to discharge of pesticides, containing influent from various industries along sites of the lake.

Most of sites of lake are seriously polluted by industrial effluents. Effluents are waste products in liquid form resulting from industrial processing. They are released by different industries such as petrochemical complex, fertilizer factories, Oil refineries, Pulp paper, textile, Sugar, Steel mills and tanneries etc. All the chemicals of industrial waste are toxic to animal and many cases of death or sub-lethal pathology of liver, kidney, reproductive system, nervous system of fishes have been

By discharge from the effluent inflows, amount of pesticides in water show an increase. They are present in water in dissolved condition form only at low levels, since pesticide compounds have low solubility. Mineral suspension and precipitation substances are able to store pesticides ions on their outer surface. Pesticides can also be found in water organisms. They can be taken up by higher organism through the food chain and sink to bottom as sediment.

Pesticides are pollutants which affect the aquatic fish. Presence of pesticides show alteration of behavior, bio-accumulation of pesticides in the body of fish histopathological and biochemical alterations in fish. Pesticides also effect early life stages of fish. (Table-1).

MATERIAL AND METHODS

Water samples were collected seasonally during June 2011 to July 2012 from polluted and non polluted selected sites using rotterner water sampler and were estimated by standard methods as given by APHA (1985). Fishes are collected, arranged, preserved, identify and classify based on the work of Jhingran (1982), with slight modification as followed by Day's Fauna (1989) and Jayaram (1999).

RESULTS AND DISCUSSION

All pest destruction agents are collectively known as pesticides. The most frequent used pesticides are insecticides, herbicides and fungicides. Pesticides are of two type naturally occurring and synthetic pesticide. Synthetic pesticides like chlorinate organophosphate and carbamate. Choroethoxybenzate are most toxic to vertebrate

## RESEARCH ARTICLE

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#### ABSTRACT

The pollutants and drastic environmental variation have also adversely effected and changed water qualities i.e. colour, hardness, turbidity, alkalinity, pH, COD, BOD and TDS etc. Aquatic life, thus, also is affected. Changes in morphology of fish like- colour, pigmentation, length, weight mass, structure of scales, finrays etc. may occur. This can not be ignored that the afore-mention variation may be responsible to develop new varieties or sub species. Unfortunately, negligible work is done in relation to fish fauna of the area in recent-past. Though, appreciable limnological work is done, yet the fish fauna remained unexplored. The fauna study is of tremendous significance in determining population density and calculating sub specific diversity and conservation of ecosystem in Damoh District.

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#### INTRODUCTION

The Bundelkhand region of north India is encompassed by two states, i.e., M.P. and U.P. Its greater part falls in M.P. covering 5 district viz. Damoh, Sagar, Chhatarpur, Tikamgarh and Panna. Its terrain being rocky has reduced water level, and due to this, the area has much irrigation potentiality. With a view to meet this demand of the region M.P. state irrigation department is giving greater importance to the development of irrigation projects in Bundelkhand region. Accordingly, many major, medium and minor irrigation reservoirs are constructed. Rajnagar lake, Ponds and river's (Kopra, Sunar and Viyarna), are located in Damoh district of M.P. The entire surrounding of the water bodies is covered by deciduous forest. A sparsely bushy Jungle also exists at the basin of the reservoirs. Although, the district is rich in having natural water bodies, like lake, Ponds, reservoir and rivers. Very scanty work is available on the fresh water, fish fauna. These water bodies are main source of water supply, which is utilized for drinking, bathing, washing etc. But now a days, these water bodies are highly polluted due to the Industrial effluents, insecticides, herbicides, weedicides, fungicides and other human activities, Nitrate, Calcium chloride and non soluble Phosphate have increased to alarming level and decomposition of excessive bloom releases the methane and ammonia gases in water. Study of biodiversity of fish fauna and their identification is

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#### RESULTS AND DISCUSSION