

**List of Ph.D. awarded from the Zoology Department, SRT Campus from
15 Jan., 2009 to Dec. 2020**

S.N.	Name of Research Scholar	Name of Supervisor	Date of Registration	Date of Completion	Topic of Research
1.	Jagbir Singh	Prof. B. S. Bisht	Date:28-08-2003 Registration Number: HNBGU/Res/121435	Date of Viva-voce : 2009	Biology, Bionomics and control measures of <i>Hymenia recurvalis</i> fabricius (<i>Spoladearecurvalis</i> Fab.) (Pyralidae : Lepidoptera) in Garhwal hills, Uttaranchal
<p>Abstract in few words:</p> <p>The investigation entitled 'Biology, bionomics and control measure of <i>Hymeniarecurvalis</i> Fabricius (<i>Spoladearecurvalis</i> Fab.) (Pyralidae : Lepidoptera) in Garhwal hills, Uttaranchal' was undertaken in the farmers' fields of District Tehri Garhwal. The study was focused on the population dynamics, nature and extent of damage, growth and development, impact of climatic factors on the population, natural enemies and evaluation of some eco-friendly insecticides and bio-pesticides against the <i>H. recurvalis</i>. The study was basically planned to generate the information required for the development of a holistic management module against the <i>H. recurvalis</i>, a major threat to the amaranth growers of Garhwal Himalayas.</p>					
2.	Mr. Neeraj Khare	Prof. Dinesh K Sharma	Date:30.10.2007 Registration Number: GHNBGU-Res.-227	Date of Viva-voce : 1.04.2013	Ph.D. Topic: <i>Agrobacterium</i> mediated genetic transformation of tomato using <i>mtID</i> gene for abiotic stress tolerance
<p>Abstract in few words:</p> <p>As a part of PhD programme worked on "Agrobacterium mediated genetic transformation of tomato using <i>mtID</i> gene for abiotic stress tolerance". Osmolytes are one of the several factors known to help in maintaining the osmotic potential within cells under stress which are also nontoxic to plants even when present at high concentration in cell. Keeping this aspect in our mind, genetic transformation of tomato was carried out using mannitol-1-phosphodehydrogenase (<i>mtID</i>) gene which is known to accumulate mannitol (osmolyte). Transgene integration was confirmed by PCR, dot blot and Southern analysis. Expression of <i>mtID</i> gene into transgenic tomato was confirmed by Reverse transcriptase-PCR and direct mannitol-1-dehydrogenase enzyme activity. As a consequence of <i>mtID</i> gene expression, the tolerance in transgenic tomato against abiotic stress was also altered which is evidenced by antioxidant enzyme activity, relative water content, electrolyte leakage, malondialdehyde content, salinity tolerance bioassay, polyethylene glycol bioassay. The research work was published in Plant Cell Tissue and Organ Culture</p>					

3.	Ashok Kumar	Prof. B.S. Bisht	Date:25/05/2009 Registration Number: G59941	Date of Viva-voce : 22/06/2013	Ph.D. Topic: Bio-remediation of Solid & Liquid Waste Using Microorganisms
<p>Abstract in few words:</p> <p>The samples viz. liquid and solid wastes collected from 40 selected sites of Uttarakhand state. The physico-chemical and microbial analysis was done according to standard method. In this study, 72 samples were collected in triplicate including solid, liquid and river water samples. Total eight metals (Cd, Co, Cr, Cu, Mn, Ni, Pb and Zn) were observed in all samples analyzed. The metals Cd, Cr, Cu, Mn and Zn were reported higher in liquid waste (55.5 mg/L at KR, 11.9 at RR, 8.56 mg/L at HR, 6.503 mg/l at LD and 2.56 mg/L at CR) than solid waste (35.5 mg/L at KR, 8.9 mg/L at RR, 3.568 mg/L AM and 0.234 mg/L at TP) respectively. However, Mn was much higher than other metals. Whereas, Ni, Co and Pb were reported higher in solid waste (7.6 mg/L at MR, 0.905 mg/L at MR and 0. 896 at RP) than liquid waste (5.3 mg/L at RR, 0.50 mg/L at PN and 0.865 mg/L at RK) respectively. However, metal concentration at some sampling sites reported above permissible limit. As per heavy metal concentration in the waste sample, sample from six locations were selected for bioremediation. The seven microbial strains were acclimatized. The acclimated microbial strains were used as bioadsorbent for bioremediation of solid and liquid waste samples. The efficient biosorption was observed under optimum conditions. The slight change in pH and temperature were observed during three days of experiment. The acclimated <i>Bacillus sp.</i> and <i>Pseudomonas sp.</i> were reported for the maximum biosorption of Cu (3.332 mg/g and 4.165 mg/g) and Ni (3.800 mg/g and 5.015 mg/g) respectively. The removal efficiency of <i>Bacillus sp.</i> was recorded 48% (Ni) and 65% (Cu), while in <i>Pseudomonas sp.</i>, it was 56% (Ni) and 68% (Cu). The results also revealed that <i>Bacillus sp.</i> and <i>Pseudomonas sp.</i> were good Cu accumulator. The acclimated <i>Staphylococcus sp.</i> and <i>Streptomyces sp.</i> were recorded for maximum biosorption of Cu (2.615 mg/g and 1.129 mg/g), Cr (4.108 mg/g and 6.42 mg/g) and Pb (0.813 mg/g and 0.286 mg/g) respectively. The bioremediation potential of <i>Staphylococcus sp.</i> and <i>Streptomyces sp.</i> was 42% (Cu), 45% (Cr), 82.58% (Pb) and 18% (Cu), 32% (Pb), 72% (Cr) respectively. It has been suggested that due to poor performance of <i>Corynebacterium sp.</i>, <i>Flavobacterium sp.</i> and <i>A. niger</i>, they can be marginalized in future experiments. The <i>Pseudomonas sp.</i>, <i>Bacillus sp.</i>, <i>Streptomyces sp.</i> and <i>Staphylococcus sp.</i> can be used for heavy metal removal from the waste in the future.</p>					
4	Mr. Dharmendra K. Chaudhary	Prof. N K Agarwal	Date: 12 -05- 2009 Registration number : HNBGU / Res/22768	Date of Viva-voce : 30 July 2014	Development of monoclonal antibody based marker for putative T-Cell of <i>Catla catla</i> .
<p>Abstract in few words:</p> <p>During the present investigation, monoclonal antibody (MAb) to putative T cells of <i>Catla catla</i> was developed using paraformaldehyde-fixed nylon wool-enriched thymus mononuclear cells (MNCs) as the immunizing antigen. In addition, two cell lines from <i>catla</i> thymus viz. <i>catla</i> thymus macrophage (CTM), <i>catla</i> thymus epithelial (CTE) cell line and one cell line from adherent blood mononuclear cells (CCM) were developed and used for checking the specificity of the developed anti-T cell monoclonal antibody (B8 MAb). The T cells in lymphoid organs and blood were enumerated by flow cytometry and their distribution in these tissues was studied by immunoperoxidase test, using B8 MAb.</p>					

5.	Mr. Harpal Singh	Prof. N K Agarwal	Date: 14 th May 2009 Registration number : HNBGU/Res/227 59	Date of Viva-voce : 9 th Jan. 2015	Impoundment of the Bhilangana river for the Tehri Dam Reservoir: A Hydro-biological study with special reference to Habitat alteration and Fisheries development.
<p>Abstract in few words:</p> <p>The study has investigated the impact of the Bhilangana river impoundment on its hydrobiology and fish diversity. The Physiochemical characteristics (viz. water temperature, transparency, turbidity, velocity, turbidity, pH, DO, free CO₂, alkalinity, nitrate, phosphate etc) and phytoplankton diversity and density of river at upstream and downstream to Tehri dam were determined. The fish diversity along with fishery of the impounded river was also studied in perspective of the fragmentation and alteration of riverine habitat. Study has documented the significant impacts of the Tehri dam on the hydrobiology and fish diversity of river Bhilangana. The diversity and density of Chlorophyceae members significantly increased in the impounded water in contrast to the free-flowing site and downstream site. Only four fish species were recorded from impounded water in comparison to Sixteen species from downstream and twenty-one fish species from natural free-flowing upstream to reservoir sites. The study has provided the baseline information for the development of reservoir fisheries.</p>					
6.	Suman Negi	Prof. Dinesh K Sharma	Date: 26.05.2009 Registration Number: Reg. NO. HNBGU/Res/227 61	Date of Viva-voce : 22.04.2015	Ph.D. Topic: Habitat And Breeding Ecology Of Indian Black Francolin (<i>Francolinus Francolinus Asiae</i> Bonaparte 1856) In Garhwal Himalaya
<p>Abstract in few words:</p> <p><i>Francolinus Francolinus Asiae</i> is ground dwelling and one of the indicator species for changing habitat and environmental conditions. The aim of the present work is to provide in-depth information on breeding and habitat use and preference at different altitudes in different habitat composition. Data was collected at four study sites. The study sites were chosen covering almost all the habitat types within its distributional range. The data was documented using direct sightings, indirect evidences like pellets, feathers, calls and through questionnaires. The study shows that the subtropical mixed deciduous, pine mixed, oak mixed are the habitats preferred by Black Francolins for breeding, foraging and roosting. Most of the sightings were made in the habitats where shrub cover was of 1-2 m in height. The study recommends that in order to maintain the populations of the Black Francolins in Garhwal Himalaya, multi-disciplinary action needs to be taken to conserve this bird in the region.</p>					

7.	Mr. Gurnam Singh	Prof. N K Agarwal	Date: 8 th April 2011 Registration Number: LZ - 13032	Date of Viva-voce : 13 th Feb.2016	Impact of riverine fragmentation and various anthropogenic activities on Ichthyofaunal diversity in Alaknanda river system
<p>Abstract in few words:</p> <p>River Alaknanda along with its two tributaries – river Pinder and Mandakini were studied to assess the impact of urbanization on water quality variables and its associated fish fauna. Two other tributaries of Alaknanda, namely river Nandakini and Birahiganga were studied for the assessment of impact of hydropower projects. Together with these large tributaries of river Alaknanda, five relatively less disturbed small tributaries- the Dhauliganga (snow-fed) and Garurganga, Balkilla, Khanda and Takoli gad (all spring-fed) were also assessed for the status of fish fauna. Species richness and their relative abundance were reported varying with reference to altitude, magnitude of water discharge, flow rate, physico-chemical variables and habitat features. The fish diversity and their relative abundance were reported considerably low in fragmented stretches of the river than the continuous flowing stretches. The seasonal variation in species richness was also studied with their causal factors. The fishing methods in the region varied with the topography and magnitude of total discharge of river and classified into four categories depending upon their nature of operation and net output. The major threats having direct impact on the endemic fish fauna were identified as - fragmentation of river by damming, use of destructive fishing methods, anthropogenic disturbances and natural cataclysmic events</p>					
8.	Manisha Nanda	Prof. Dinesh K Sharma	Date:16-5-2009 Registration Number: HNBGU / Res / 22793	Date of Viva-voce : 2016	Ph.D. Topic: Removal of Heavy Metals from Effluent of Pharamaceutical Industry Using Bacterial Strains
<p>Abstract in few words:</p> <p>The study involved the isolation and characterization of bacteria tolerant to heavy metals {Cadmium (Cd), Arsenic (As), Mercury (Hg), Copper (Cu) and Cobalt (Co)} from the identified samples. Further the Maximum Tolerable Concentration (MTC) of the isolated bacteria against the selected heavy metals was also determined. The isolated bacteria, which were found to be most efficient for bioremediation, were selected. After their characterization, a series of biosorption experiments were carried out to study their potential for the removal of the heavy metals in the effluent samples collected from selected pharmaceutical industries. The identified bacteria were then used for the treatment/removal of heavy metals from the some selected effluent samples. Further, plasmid DNA of the selected bacterial isolates was isolated. The plasmid DNA isolated from the studied bacteria were quantified using UV spectrophotometry. The plasmid profiles of the above bacteria were also determined. The genetic determinants for resistance to heavy metals can be present on plasmids as well as on chromosomes. The findings of the study indicated multi-heavy metal tolerance in the</p>					

	isolated bacteria. Heavy metal binding capability was more prominent in Gram-positive than gram-negative bacteria. The bacteria displaying multiple resistances to different heavy metals carry larger plasmids than the bacteria resistant to single or few heavy metals. The bacterial isolates effectively removed the heavy metals from the industrial effluent as indicated by the statistical analysis of the various bioremediation experiments done during the study.				
9.	Anand Kumar	Prof. Dinesh K Sharma	Date: 15 April, 2011 Registration Number: HNBGU/Res/LZ-13031	Date of Viva-voce : 22 Aug., 2017	Ph.D. Topic: Phylogeographical structure and Mitochondrial DNA sequence variations in Genus <i>Francolinus</i> in Uttarakhand”
<p>Abstract in few words (about 100 words)</p> <p>The present research work entitled “<i>Phylogeographical structure and Mitochondrial DNA sequence variations in Genus Francolinus in Uttarakhand</i>” is focused on habitat ecology and described genetic polymorphism, based on mitochondrial control region of Black and grey francolin from North Western Himalayan region. The lack of updated demographic records and unavailability of genetic data, marks uncertainty over the conservation status of these species. In the present study we analysed a large number of samples, possibly the largest genetic dataset on black francolin from this region to our knowledge. The findings of this study affirm the distribution of localised sub species group of black francolin. Previously, only one subspecies of black francolin was explained in India ie. <i>Francolinus. f. asiae</i>, However, we have suggested possible presence of <i>Francolinus. f. henrici</i> in our samples recorded from Northern India. We further explained <i>F. f. asiae</i> is the most abundant subspecies extending its range from North to Central regions. However, <i>F. f. henrici</i> peaked in higher altitude samples recorded, while its lower frequency occurred in the low-lying regions. Our study is first in-depth genetic study on this species along this landscape which offer cogent management recommendations for the long-term protection of these species within an adaptive conservation framework.</p>					
10	Neeraj Kumar Sharma	Dr. Ravindra Singh	Date: 11/03/2013 Registration Number: LZ-14234	Date of Viva-voce : 20/06/2018	Ph.D. Topic: Studies on season dependent physio-metabolic indices and thermal tolerance of <i>Barilius Bendelisis</i> (Hamilton)
<p>Abstract in few words (about 100 words)</p> <p>The present work incorporates the results of study made on its seasonal physio-metabolic responses and thermal tolerance for understanding the seasonal physiology of <i>B. bendelisis</i> from a tributary of Kosi River (a wild habitat). The result obtained from the hematological and serum biochemical parameters indicated that the <i>B. bendelisis</i> showed significant variation in hematological and serum biochemical parameters with respect to sex, reproductive state, and seasonal environmental factors. The results of seasonal metabolic</p>					

	<p>and antioxidative enzymes in muscle, liver, and gill of <i>B. bendelisis</i> juveniles demonstrated noticeable tissue-specific activity of the investigated enzymes and roles of seasonal factors in regulating them. There was a significant variation in the serum sex steroids (testosterone (T), estradiol (E₂), progesterone (P₄), 17α, 20β-dihydroxyprogesterone (17,20β-P)), thyroid hormones (T₃ and T₄), cortisol, vitellogenin (VTG), aromatase activity (ARO) and total antioxidant capacity (TAC) in male and female <i>B. bendelisis</i> between different seasons that may have been related to gonadal development. The present study found thermal tolerance (CTmax, LTmax, and CTmin, LTmin) and rate of oxygen consumption of <i>B. bendelisis</i> to be significantly different between five seasons; with a greater range during the summer season followed by lowest in winter season. This implies that <i>B. bendelisis</i> showed significant thermal plasticity among five seasons of the year. The base line data collected during the present study might be of immense help to the researchers, professors and fishery scientists working on protein requirement; proteomics, breeding and advance study concerning the acclimation mechanism that <i>B. bendelisis</i> has adapted to survive the fragile and sensitive Himalayan environment.</p>				
11.	Amir Bashir	Prof. B. S. Bisht	Date:11-03-2013 Registration Number: LZ-14243	Date of Viva-voce : 2019	Ph.D. Topic: Molecular characterization of fish species of family Cyprinidae, Balitoridae and sisoridae from Kashmir valley, India
	<p>Abstract in few words</p> <p>Our Study identified both morphological and mtDNA markers to discriminate all the 12 important fish species belonging to three i.e., families Cyprinidae, Balitoridae and Sisoridae. This study validated the existence of only five Schizothorax species from Kashmir valley. The taxonomic status of <i>B. diplostoma</i> and <i>C. diplochilus</i> was validated both by morphometric and molecular study and both are two distinct species. Further the taxonomic status of <i>T. marmorata</i> and <i>T. kashmirensis</i> was cleared and both species are two different species though doubted previously. Based on our observation, the inferred molecular data indicates that the assignment <i>T. marmorata</i> and <i>T. kashmirensis</i> species among the family Balitoridae is improper and they are closer to family Nemacheilidae. So their inclusion in family Nemacheilidae is appropriate.</p> <p>During the present study the morphometric and molecular data clearly supports each other in identification and phylogeny of these 12 species from Kashmir valley, India. We report the variation (intra and inter-specific) among species of family Cyprinidae, Balitoridae and Sisoridae based on comparative (morphological and molecular) evidences for the first time from Kashmir valley. This study has built a baseline data on both morphometric and molecular approach for fish characterization and the results will be helpful in proper identification and planning conservation and management strategies for the propagation of these important fish species in the Kashmir valley.</p>				
12.	Mr. Alauddin	Prof. N K Agarwal	Date: 28-4-2014 Registration Number: LZ - 15256	Date of Viva-voce : 6 th March 2020	Biological evaluation of Selected Natural Isoflavonoids on gastric and hepatic disorders in <i>Sprague dawley</i> rats

Abstract in few words

Natural Isoflavonoids possess numerous pharmacological activities that may be helpful in clinical conditions after proper screening and relevant studies in drug discovery and development settings. The protective effects of isoflavones in hepatotoxicity and gastrointestinal ulcers have been studied exhaustively in the present Ph.D. thesis. The biological evaluation of selected natural flavonoids has been carried out for traditional medicinal approach for their use as potential therapy and to ameliorate therapy related hepatotoxicity. Gastroprotective effect of Formononetin, a methoxylated isoflavone has shown promising results against ethanol-induced gastric ulceration in rats via augmentation of cytoprotective markers and curtailing apoptotic gene expression. The therapy induced amelioration of hepatotoxicity was also reported by the co-administration of Formononetin (FMN) and Biochanin A (BCA) with prescription medicine Ritonavir induced hepatotoxicity in *Sprague dawley* rats. FMN and BCA exerted hepatoprotective effect through modulating the oxidative stress, inflammation, apoptosis and reversing the tissue degeneration suggesting its potential therapeutic role in hepatotoxicity and other hepato-cellular diseases.