MATERIALS AND METHOD
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Four lemroids have been reported from Bundelkhand region. Out of four lemroids *L. paucicostata* was particularly chosen as experimental material to study prospects of its utilization, in agriculture of wheat, because of its common size, free floating hydrophytic plant body and ease of *in vitro* culture.

*L. paucicostata* was collected from ponds in healthy condition and plants of equal size and shape were carefully selected. Selected plants were vigorously washed in tap water to remove adhering debris and algae. Finally, the material washed with distilled water and used for obtaining extracts.

Application of *L. paucicostata* in agriculture were studied with special reference to their utilization for obtaining extracts containing growth substances. Genetically tested seeds of wheat var. "Shekhar/K 7410" were obtained from C.S. Azad University of Agriculture and Technology, Kanpur. Seeds of approximately same size and weight were selected for experiment.
The extract of *L. paucicostata* were made in water and solvent ether. As ether is injurious to plant growth it was allowed to evaporate and growth promoting substances were suspended in water. Five millilitre of *L. paucicostata* by volume was taken and grind in a clean procelain mortar with water or ether. In case of water extract sufficient water was added to make it 100 ml. to have a five percent extract. In case of ether extract, ether was first allowed to evaporate and the suspension was then made to 100 ml. in distilled water. Two and one percent extracts were made by further dilutions with distilled water. Hundred seeds were soaked in sterilized petridishes in different concentrations (1, 2 and 5 percent) of water and ether extracts of *L. paucicostata* and distilled water (control) for 6, 12 and 24 hours. Desired concentrations used in experiments to study various parameters are specified separately below.

After the soaking period seedlings were sown in test tubes filled with distilled water on equal sized filter papers following Garrard's (1954) technique. The experiments were set at a temperature of 20°-24°C, the normal required temperature for the crop in field.
PHOTO - 3: SURFACE VIEW OF PETRI-DISH SHOWING \textit{IN VITRO} GROWTH OF \textit{Lemna paucicostata} FRONDS
Observations were recorded every twenty four hours within experimental period 96 hours on length of primary root, number of secondary roots, length of plumule.

The response of treatments was studied under field conditions in the garden beds laid for specific purposes with dimensions of 10 feet in breadth and 12 feet in length. Each bed was sown with 4 rows containing 10 seeds spaced 25 cm in rows 70 cm apart. Thus, total number of plants grown in each bed were 40 out of which 35 were selected for observations. Two beds of each treatment and normal untreated control were laid to raise 100 replicates. Seeds of wheat var. "Shekhar/K 7410" were soaked for 6, 12 and 24 hours in 1, 2 and 5 per cent of water and ether extracts of *L. paucicostata* plants. Field beds were prepared after ploughing the area and mixing adequate amount of manure in ratio of 3 parts of soil and 1 part of cowdung manure in upper crust of soil. Seeds were soaked in distilled water. Soaked seed were similarly sown and served as control.

Records were made on vegetative growth with special reference to height of plants, number of tillers
per plant, number of leaves and average length and breadth of leaves at an interval of 15 days (30, 45, 60, 75, 90 and 105 days) during 105 days duration of the crop. Observations on yield were made over number of ears per plant, number of floral branches, ear maturation period and trend of ear setting. The mature crop was then harvested after 105 days and fresh weight of vegetative foliage, fresh weight of ears, fresh weight of single ear were recorded. Observations on dry weight of straw per plant, dry weight of ears per plant, dry weight of single ear per plant and dry weight of 1000 seeds and percentage ear emergence per day and time required for ear emergence were recorded. Dry weights were recorded after sun drying for a period of 7 days and then placing them in an incubator maintained at 35°C to be weighed till their dry weights were constant. Increase in yield of wheat var. "Shekhar/K 7410" was then calculated on the basis of yield in experimental plots. Observations were made on 100 replicates and average results were taken into consideration.

Assay of nitrogen, protein, phosphorus and potassium contents in seeds collected from plants after 105 days from treated plants with _L. paucicostata_ extracts in
PHOTO - 4: LATERAL VIEW OF BEAKER SHOWING IN VITRO GROWTH OF *Lemna paucicostata* FRONDS
concentrations (1, 2 and 5 percent) of water and ether extracts applied for 6, 12 and 24 hours pre-soaking treatment and untreated plants was made in replicates of five average results were taken into consideration.

Estimation of nitrogen contents were made by usual Micro-Kjeldahl's procedure. Distillate was collected in 4 percent boric acid, which was titrated by N/10 HCl using mixed indicator of Bromocressol (green) and Methyl red mixture (5:1). Protein percentages was then calculated by applying protein factor (N x 6.25).

Phosphorus contents estimated by Jackson's (1967) colorimetric method. The solution was diluted to about 4.5 ml and then 2ml of sulphotolybdic acid solution is added. To it 0.5 ml of chlorostannous acid is added and shaken. After 5 minutes it is subjected to calorimetry where percentage transmission at 660 m\(\mu\) is determined. Alternatively an aliquot of 2 to 20 ppm standard phosphate solutions may be taken in 50 ml volumetric flask. Develop colour exactly as in test solution.

Potassium contents estimated by perchloric acid digestion and cobalt nitrate method as described by Piper (1950). Potassium is precipitated as cobalt
nitrate complex which is dissolved in 2 N-\(\text{H}_2\text{SO}_4\) in presence of excess of \(\text{KMnO}_4\) and remaining permagnate is back titrated with oxalic acid and potassium estimated.

Effect of \textit{L. paucicostata} extracts on root and stem anatomy of wheat var. “Shekhar/K 7410” plants was studied by usual techniques of fixation of desired parts of material and subsequently, obtaining its microtomic sections. The sections were dehydrated, stained and observations made as detailed below.

Root Material was cut from both treated (1, 2 and 5 percent) water and ether extracts of \textit{L. paucicostata} and normal untreated plants used as control. Treated plants were sown over filter papers following Garrard’s (1954) technique and roots were collected after seedlings attained 144 hours age. In view to obtain uniform effect of treatments pieces of roots were carefully selected from four cm below root-shoot transition zone. Material of stem was cut carefully from both treatments (1, 2 and 5 percent) water and ether extracts of \textit{L. paucicostata} and control. Application of pre-soaking seed treatments for 6, 12 and 24 hours were made. Treated and control plants were grown in garden beds as described earlier. Stem pieces of 2
of leaves. Both upper and lower epidermal peelings were taken out and stained preparations were observed microscopically. Observations on number of stomata, perimeter of single stomatal opening, number of epidermal cells, length of epidermal cells and breadth of epidermal cells were made in an area of 1984 Sq./μ of leaf peelings. Average of 100 replicates were taken into consideration.

Statistical analysis of data was done following analysis of variance method at 5 percent error probability for testing the significance of the effect of treatments. Results of statistical analysis are entered in respective observation tables.