CHAPTER –9

EFFECTS OF POLLUTED STREAM ON PLANT DISTRIBUTION

To study the effect of polluted stream on the natural habitat and other behavior of seedling growth, an experiment was carried out on a section of Hindane river being polluted by the discharge of paper mill effluent from “Star Paper Mill Ltd., Saharanpur” and domestic effluents. Earlier work done by Singh and Bhargava (1984), Goel (1982) and Kumar (1998) provided reference for the work.

Figure 53 (A & B) shows a natural set up for the comparative study on the distribution of plants as affected by clean and polluted water. Clean stream coming from one side and polluted stream from the other side merges at a point and from the point of confluence continues flowing unmixed for quite some distance as indicated in the photographs. Both the clean and the polluted streams from the point of confluence can be easily demarcated by a line showing clean water and brown coloured polluted water separately.

For the study on the distribution of plants growing on the bank of clean and polluted streams, three sites were chosen one site before the confluence and two sites after the confluence (Figure 54). At each site plants were sampled both from the clean and polluted side. Site 1 is chosen where the
clean and polluted stream are totally separated whereas, at site 2, clean and polluted stream flow side by side relatively unmixed. At site 3, both the clean and the polluted streams mix and cannot be distinguished. The three sites chosen were located at equal distance. Plant distribution study was done by quadrate method using a quadrate of 50x50 cm size, each site being 5mx5m size.

Table 63 shows the record of total plants and the frequency, density and abundance of the majority of the plants present at all three sites. Table 62 shows the water and soil samples collected from the three sites along with their colour and their respective pH. A comparison in pH values of the water from the clean and polluted stream and also of the soil from the bank of the clean and the polluted stream, shows a lower pH level of the clean water with that of the polluted water which is slightly more than neutral (pH=8.3) at site 1 and 2. As the site 3 advance very narrow difference in the pH of clean and polluted water was recorded as the stream almost completely mix with each other. The pH of the soil collected from the bank of polluted stream showed a slight shift towards alkalinity. A similar pattern of increase in pH was also noted in case of clean stream soil, but the range of increase in pH was more in clean stream soil than the polluted soil.

Table 63 shows a pattern of distribution of different plant species as affected by clean and polluted streams. It was observed that some plant species show an affinity towards polluted water, thus grows well on the bank of polluted streams.
Plants like *Amaranthus spinosus*, *Alternanthera sessilis*, and *Parthenium hysterophorus* show higher frequency, density and abundance on the polluted stream bank whereas, plants as *Euphorbia hirta*, *Rumex dentatus*, *Veronica cineria* show a lower frequency, density and abundance towards the polluted side. On the other hand plants like, *cyperus rotundus*, *Ranunculus scleratus* and preferably grow on the clean stream bank, thus show a higher frequency, density and abundance on the clean stream bank. Thus show a higher frequency, density and abundance on clean stream bank. On the contrary plants like *chemopodium sps.* and *Poa* show a similar frequency, density and abundance on both the streams, thus showing equal distribution of these plant species on the cleaner and polluted stream side. Result thus shows that although the paper mill effluent domestic polluted stream proves to be detrimental to vegetation still some species of plant are tolerant and survive well in the polluted water and soil. These tolerant species of plant act as indicator or accumulator (Ernst, 1976; Bhargava, 1983 & Srivastava, 1988).