INTRODUCTION

Poplars belong to genus Populus Linn. of family Salicaceae. Populus is a genus of deciduous trees commonly known under the names aspen, poplars and cotton wood. Poplars amongst the world’s fastest growing industrial soft wood widely distributed in areas with cooler climate in northern hemisphere. Important countries where poplar plantation occur are Australia, Italy, U.S.A., France, Spain, Korea Hungry, Yugoslavia, Romania, Germany and Belgium.

Though there are several fast growing species like Eucalyptus, pines, cryptomeria etc., apart from poplars which can give a higher wood productivity (Kaul, 1980) but the case of propagation through clines and therefore, the choice to select genetically superior varieties, singles out populus as an ideal genus. The variety of uses to which this timber can be put is another point which put it above other species. Growing of poplars in most of the countries was intiated to meet the challenge of increasing shortage of wood.

Poplar was first introduced in India by forest department in the year 1950. Cultivation of poplars has a well defined scope in lands outside state forests in intensively cultivated states lacking natural facts. Poplar cultivation has great future prospect from the economic as well as forestry point of view because they can be easily cultivated at fast growth, comparatively easily manageable with multiplurpose utilization but also ecologically and
silviculturally desirable to extend their cultivation in our coniferous forests. Poplars have a rapid growth rate and many clones/varieties/cultivars can be economically harvested at short rotation of up to 12 years. However, unless farmers are motivated and made to plant poplar on their field, the desired goal cannot be achieved. The farmers are convinced to grow poplar on account of its compatibility with agricultural crops and quick growing nature.

In recent years poplars have been increasingly cultivated. This genus is particularly evident in J. & K., Uttar Pradesh, Himachal Pradesh, Punjab, Haryana and Arunachal Pradesh. Several species of poplars, both indigenous and exotic have assumed great importance in our regular plantation programmes as well as in social forestry. Various clones of *Populus deltoides* are doing well in plantations raised in the plains region of northern India.

Owing to their specific photo-periodic requirement poplar have only a limited zone in India and they have shown good performance and encouraging results only in the areas lying north of approximately 28° N latitude in the state of Uttar Pradesh, J. & K., Punjab, Haryana & Himachal Pradesh. Low temperature preconditions vegetative and other cyclic responses necessary for their organised growth. The Chilean evergreen clone, which probably arose as a single gave bud
mutant of *pinus* cv. *Italica* in chili, is, day length neutral and also seems to have no thermal preconditioning requirements.

Most of the poplars planted today are cultivars or clones originating from individual selection in hybrid or non-hybrid sexual progeny.

**Clonal selection:**

The poplar is being raised as a fast growing species capable of yielding high volume at a relatively low age. Amongst the various exotic clones, *Populus deltoids* have the most promising results and is being raised on large scale in the plains of U.P. between 20°N to 30°N latitude.

Spacing has marked influence on growth and volume production (Singh and Mittal, 1983). It is possible to get higher yield at much shorter rotation with dense plantings. They obtained the maximum volume production at 3.5 x 3.5 m spacing for having significant effect in the growth of diameter in early years. The rotation for maximum production appears to be 12 years.

Manures and fertilizers application play a vital role in growth and development of poplars for planting in deep pit is prepared and lower half soil of the pit is removed. 10 kg well decomposed compostor farm yard manure,
50 g single super phosphate 25 g urea and 10-15 g Aldrix or Aldrin per pit is mixed in the pit soil. In areas where zinc deficiency is common, addition of 25 g zinc sulphate per pit is also advisable. No fertilizers are required after planting poplars till harvesting if intercrops are taken with poplar. However, where intercrops are not grown adding 20 g nitrogen per plant per year is beneficial.

Due to deciduous nature, poplars are pruned during their dormant period i.e. December to February. Summer pruning never adopted in deciduous trees because removal of plant-part at this time will prohibit leaf function and plant will be devoided of further growth. Summer pruning can also prolong growth of new shoots and these shoots are more susceptible to winter injury because these shoots do not get sufficient time for maturity. No pruning is needed in 1st year. In second year main shoot should be made free of branches upto 2m height and co-leaders should also be removed.

Rate of growth varies and it give the volume of mature material of wood is produced. It matters the cultivation and yield. Recently, Chaturvedi (1981) concluded that the rate of growth in respect of height was higher between the 5th and 6th year while diameter growth was maximum between 4th and 5th year. Rate of growth shows a declining trend between 9th and 12th year and volume increment culminate
between 10th and 12th year. These were 24.33 M$^3$, 84.42 M$^3$, 89.45 M$^3$ and 109.67 M$^3$ per hectare volume production from *Populus deltoides* 'IC' at 4, 8, 10 and 12 years age. Thus the ideal age for harvesting is determined at 11 or 12 years whereas Mathur and Sharma (1983) found that poplar may be harvested economically with 8 years rotation to get maximum net present volume and benefit/cost ratio.

Poplar yields a light weight, light colour wood with multiplicity of uses. Poplar wood is in much demand for paper and pulp industry. Various grades of plywood and pencial stat. (Rajawat and Bisht, 1981), for match industry (15:1140-1970), fibre boards, box making industries and light constructional timber all over the world. The wood besides its use in match industry, is also suitable for packing cases.

Poplar species for large scale plantations can cater to the needs growing demand for industrial use in order to relieve the strain and pressure on our fast deteriorating and fast receding forests. Poplars offer the potential for bridging the widening gap between demand and supply of soft wood in our country. In fact poplar constitute a veritable 'Saving Bank' which the farmer can convert into liquid funds any time after it is ready for harvesting because of the easy marketability for industrial use.
In India poplars and Eucalyptus are being raised as a fast growing species capable of yielding high volume at a relatively low age. The large scale plantations will help in meeting the demand of raw material for match, paper and pulp and fibre board industries. Eucalyptus is recognised as important for industrial plantations and a good species for fuelwood as it grows fast, can be closely planted and is not prone to grazing.

Growing intercrops in young plantations is fairly common practice as these crops help to give some income which can defray the expenses of establishment and maintenance of the plants. However, in adopting this practice it must be remembered that their competition with the tree can adversely affect tree growth and development unless there is provision for adding manures and moisture, required by the intercrops.

Poplars are eminently suited for Agro-forestry and are being raised in U.P., Punjab, Haryana and J. & K. In J. & K., Poplar is a traditional agro-forestry crop. The trees are planted at a spacing of 5 mtr. X 4 mtr. and 500 can be planted in one hectare. This spacing is sufficient to enable use of a tractor for field operations. Dalal and Trigota (1981) found that a farming system using poplars and crops appear to be well suited in
in intensively cultivated areas. Farmers can grow poplar in association with other crops as they do not occupy much space and also give very little shade. Mathur and Sharma (1983) reported that growing poplars at eight years rotation with agriculture crops in most profitable.

Therefore, present investigations on various aspects of intercropping in the plantations of poplars and Eucalyptus have been carried out for the beneficial and profitable cultivation.