

Landscape, Its concepts and Applications

Ratikanta Maiti, Nabil S. Agha, Ch. Aruna Kumari

Ex-National Sr. Research Scientist, Mexico Retd Professor Departamento de Quimica Biologia Universidad de las Americas-Puebla, Mexico

Corresponding Author

Ratikanta Maiti
e-mail: ratikanta.maiti@gmail.com

Article History

Article ID: CBM18
Received in: 8th April, 2017
Received in revised form: 26th May, 2017
Accepted in final form: 07th June, 2017

Plants constituting vegetation cover on earth surface are very important for our livelihood. They supply food, fruits, timber, honey and our daily necessities and supply oxygen for our respiration and capture carbon dioxide used in photosynthesis, in addition they are important sources of forage for grazing animals in the forest. There is an earnest necessity to conserve, protect these valuable natural resources the gifts of mother earth. In a forest, trees and shrubs of various species grow together in harmony and share solar radiation absorbed by chlorophyll present in leaves for the production of photosynthates and conservation of carbon in biomass and timbers. In a forest woody plants grow at different heights with variation of tree crowns and leaf canopy, thereby form wavy architectural pattern and landscape in their natural habitat.

Under natural habitat, landscape is a typical architectural pattern of trees in a forest and a particular woody species with its typical crown tops, branching pattern and leaf canopy cover acting as solar panel in the capture of solar energy. Tree tops and canopy architecture vary in shape, size and canopy cover in a forest ecosystem. These typical architectural patterns represents symbols of various physical and physiological functions (photosynthesis, transpiration, respiration etc. in each species and in combinations.

1. Utility of Landscape and Selection of Plant Type

Landscape has a great demand in modern world to beautify lawns, recreation parks, sport ground, children park and lawns. Landscape designer has typical selection criteria for particular plant type with beautiful architecture. Under artificial condition, a woody species having beautiful crown architecture and beautiful orientation of leaves, broad or narrow with eight 1.5 to 2 m or longer is selected by landscape architect for transplanting in city streets, lawns, recreation parks. It may be annual or perennial depending on the desire of client. It is preferable annual in garden and lawns but perennial in park, streets. Native plants with desirable landscape architecture is desirable because it requires less

maintenance, low water requirement and less of protection measure.

2. Maintenance of Landscape

Landscape designer adopt definite design in the selection of plant type and maintenance practice. After planting and establishment of trees in lawn or park, street, they adopt different mechanical methods to maintain desirable plant architecture by periodical trimming, pruning, shaping and mowing of lawns to give beautiful architecture. Regular irrigation by irrigation or aspersion is needed to promote good growth of the tree. These mechanical operations are undertaken with the help of trimmers, scissors, sharp knife and other tools which need to be practiced regularly to maintain beautiful landscape. Besides necessary plant protection measures need to be adopted.

3. Sustainability of Landscape

Dr. Nabil Agha mentioned the importance of sustainability in landscape management. Sustainability is a fashionable terminology used in landscape. He states that green plants depends on solar radiation and all animals, directly or indirectly depend on green plants for their livelihood. Our life depends on the sun which exports energy through plants during the process of photosynthesis for our benefit. In landscape, the sustainable use of bioresources is quite valid. Dr. Nabil mentioned this in Arabian Construction week, 24-26 May, 2010, held at Abu Dubai, UAE in Royal Garden, while plants exports solar energy for our benefit, Desert is an ideal place to understand sustainable ecological landscape under an extreme drought environment where overpopulations, overgrazing and harmful chemicals do not occur. In landscape, the sustainable of natural resources are exploited. He emphasized that plant maintenance is of great importance and without proper maintenance the whole effort of designing gets lost.

Dr. Nabil Agha reported the use of plant growth regulators in

landscape maintenance. In the article entitled Horticulturists matter (September, 2007) he mentioned the importance of chemical growth regulators in the maintenance of landscape growth.

Traditionally plant maintenance involves trimming, pruning, shaping and mowing of lawns using saws, pruning tools, different mowers and other machinery. Pruning helps to obtain desired shape and structure of landscape. Maintenance is done based on the growth of the plant species and on seasonal basis. It is really expensive to keep an ideal landscape. Winter pruning enhances vegetative growth and reduce flowering. Under this situation chemical growth regulators have great potential to vegetative growth and enhance flowering, thereby reduce the use of expensive physical methods.

4. The Role of Growth Retardants

Dr. Nabil Agha mentioned the role of growth regulator on landscape maintenance. Growth retardants, synthetic chemicals are applied to reduce shoot elongation. It reduces cell division and cell elongation in shoots. One such growth retardant that has a weighted advantage in reducing the growth of the desired plant species in a landscape design is Paclobutrazol. It is a new chemical used to inhibit gibberellin biosynthesis. The application of Paclobutrazol arrests shoot growth and leads to the increased production of the proportion of terminal resting buds that initiate shoots in producing terminal flower buds. It leads to enhanced production of spur flowering on older woods in the subsequent years.

Similarly, spraying paclobutrazol on lawn grass reduces its growth and the number of times the requirement of mowing. Further the grass exhibits a greener color.

Growth regulators can be classified as follows.

Growth retardants are synthetic chemicals applied to reduce elongation of shoot. It reduces cell division and cell elongation in shoots. Paclobutrazol (2-(4-chlorophenyl)-4,4-dimethyl-1,2,4-triazol-1-yl pentan-3-ol) is a new chemical which inhibits gibberellin biosynthesis. These chemicals can be used over wide range of plants starting from ornamental trees to shrubs and ground cover.

Spraying with growth retardants. Paclobutrazol initiates the growth and reduces the time of operation for mowing. It tends to exhibit strong retardant effects which last for 3 years. Therefore, the need of pruning of trees, shrubs, ground cover and mowing of grass is eliminated. Experimental evidence obtained by Dr. Nabil suggest that it is possible for young trees and shrubs to be stimulated to form adequate number of branches with M & B 25P105 after which the growth can be restricted. Therefore, there is a great possibility to control plant vigour, size, shape and more abundant flowering in Arabian Gulf.

Spraying of paclobutrazol reduces shoot growth in the year

of treatment and flowering is generally enhanced. Carry over effects are greater in the subsequent year than the year of treatment. Therefore, flowering increases the year after treatment.

5. Branching Agents

Highly branched trees and shrubs are desirable materials for landscape. Cytokinins (BA) and gibberellins (GA 4+7) are used to enhance branching. Branching agents, Promalin, equal parts of 6-benzyladenine (BA) and gibberellin induce branching. M & B 25-105 propyl has made it possible to improve branching in a wide range of poorly branched trees. It inhibits the terminal shoot growth inducing the formation of wide angled shoots. This is done by the chemical in reducing apical dominance by inhibiting the basipetal movement of auxin from the shoot tip causing the production of lateral buds.

6. Role of Salt Tolerant Plants in Landscape in UAE

In the conference Selen Ulgan mention creation of new squares and plazas, creating space and public place where landscape play a vital role. In her presentation the many trees and shrubs which are highly tolerant to salinity such as *Acacia ampliceps*, *Acacia bivenosa*, *Alternanthera marilima*, *Avicennia germinas*, *Borrchia arborescens*, *Borrchia frutscens*, *Casuarina equisetifolia*, *Coccoloba ubifera* and several other species. Among these *Sesuvium portulacastrum* with salinity tolerance up to 60,000 ppm and *Sporobolus virginicus* with salinity tolerance level up to 30,000 ppm are remarkable.

Dr. Nabil Agha mentioned that saline environment is a challenge to land use in Arabian Gulf. Under this situation salt tolerant plants are useful in landscape in saline prone areas of UAE.

He mentions a few practices in salt affected areas. The excavation of top 30 cm depth, shrubs 30 cm, tree 1.5 m x 1.5 m x 1.5 m, date palm 2x2 m² in height are used in planting after excavation. Excavation is filled with sweet soil mix with different fertilizers and other additives provide a suitable growth media. Landscape irrigation (Infra network) is adopted for the growth of plants. He mentions constraints by rapid space of growth and client expectations. He also mentions lack of recruitment of architects, designers, project manager, horticulturist in middle east, UAE.

8. Conclusion

Land scape design makes a sustainable use of resources without the generation of any harmful effects. A sustainable ecological system or landscape is desired, different species which have a good growth habit, architecture, leaf canopy, flowering ability, resistance, and fast vegetative growth habit are chosen while designing a landscape. Some of the species identified as saline tolerant can be efficiently utilized in regions where salinity is a serious problem.