VYDRO

A Miraculous Plant Substrate

"There is a way that plants speak, most of the times we are simply not patient enough, quiet enough to pay attention to the story..."

The growth medium is the most important aspect of sustainability to any landscaping endeavor. The most intricate and aesthetically pleasing landscape design will fail, if the growth medium used , does not provide sustainable growth conditions. The growing of plants involves a number of cultural inputs. Among these, the most important is the type of growing medium used. Growth media provide the appropriate physical and chemical properties necessary for plant growth. Growing plants in landscaped parks or fields varies from growing them in a private garden or in planters or pots. Many a times field soils are not found fit for growing certain plant varieties at micro level. This is primarily because such soils do not provide the aeration, drainage and water holding capacity required. To improve this situation various " soilless" growing substrates have been developed. These substrates can be engineered as per plant requirements for aeration, drainage, anchorage, etc. Some of the most commonly used amendments for the production of soilless growth media are peat and peat-like materials, wood residues, bagasse, rice husk, sand, perlite, vermiculite. Although amendment combinations may vary, basic objectives in the preparation of a growing media are alike. An effective program should produce a growing media that is:

1. Porous and well drained, yet retentive of sufficient moisture to meet the water requirements of plants between irrigations;

2. Relatively low in soluble salts, but with an adequate exchange capacity to retain and supply the elements necessary for plant growth;

3. Standardized and uniform with each batch to permit the use of standardized fertilization and irrigation programs for each successive batch;

4. Free from harmful soil pests and pathogenic organisms.

Since innumerable amendment combinations can produce a growing medium with these characteristics, it is important to consider both the economic as well as cultural optimums.

Recently, experts in the field of horticulture have put a lot of light on structural soilless growing substrates and much is yet to be explored in this arena. These substrates are generally manufactured as per company standards. Hence, the physical and chemical properties of this substrate are also standard.

One amongst the structural growth media is a substrate called VYDRO®, which is being explored by ELT India. Before putting more light on VYDRO substrate, it is important to have a basic idea about the different types of growth media.

TYPES OF GROWTH MEDIA

A proper growth medium is essential to give plants the right start. Prolonged, vigorous plant growth requires a good nutrient balance, achieved through soil additives.

Depending on the ingredients used, the intended porosity, root anchoring capacity, nutritional value, etc. growth media can be broadly classified as follows.

A. Natural Growth Media comprise of naturally occurring garden soil. Various macro and micro nutrients rich fertilizers can be added to the soil for healthy growth of plants.

B. Engineered Growth Media contain various organic substrates in fixed proportions. The advantages over natural growth media are the minimum use of fertilizers, good control over the physical properties of the media and the ease of use.

C. Structural Growth Media; unlike natural and engineered growth media, are manufactured and are available as ready to use substrates. They are superior than the other types of growth media because they are lightweight, have standard physical and chemical properties like water & nutrient retention, consistent performance in varied climatic conditions, etc.

One of the main functions of growth media is to store moisture & nutrient to supply it to plants between rainfalls or irrigations. While growing plants in any of the media, one has to keep in mind the most important aspect – fulfilling the water requirement of the plant and hence the water retention capacity of growth media. Drastic change in climatic conditions is leading to depletion of available water for horticulture as well as agriculture, thus making smart water management an essential aspect. With the world's finite water supplies under severe pressure, there is a need to create new solutions that can help manage water more intelligently. This realization led to the development of VYDRO® substrate, a completely new type of lightweight material for growing plants.

VYDRO® substrate is a polyurethane-based, extremely lightweight, chemically inert hydrophilic foam with a very high water holding capacity. It can absorb up to 30 times its own weight in water – keeping it 'locked in' to prevent casual loss through evaporation. It stores the optimum mix of air and water to ensure perfect plant growth. It is a highly versatile plant-growing medium. Due to the physical internal structure of VYDRO® substrate, water molecules can easily enter its cells, but can not easily exit them. Such water stored in the VYDRO® matrix is easily made available to plants as roots can penetrate VYDRO® substrate without much efforts. Tests have proven that vegetation grown on VYDRO® substrate requires upto 40% less irrigation, thus making it highly useful & exciting substrate for large-scale public landscapes. It offers unlimited potential to bring the benefits of smart water management in traditional gardening. Because of its high water buffering capacity & its ability to rehydrate over multiple growing cycles, VYDRO® meets the exact performance standards of a substrate and can be used as the central technology for green roofs, living walls as well as horticultural and recreational applications for a wide variety of environments, climates and plant types. Use of VYDRO® in landscapes increases planting possibilities, improves weed control, reduces maintenance.

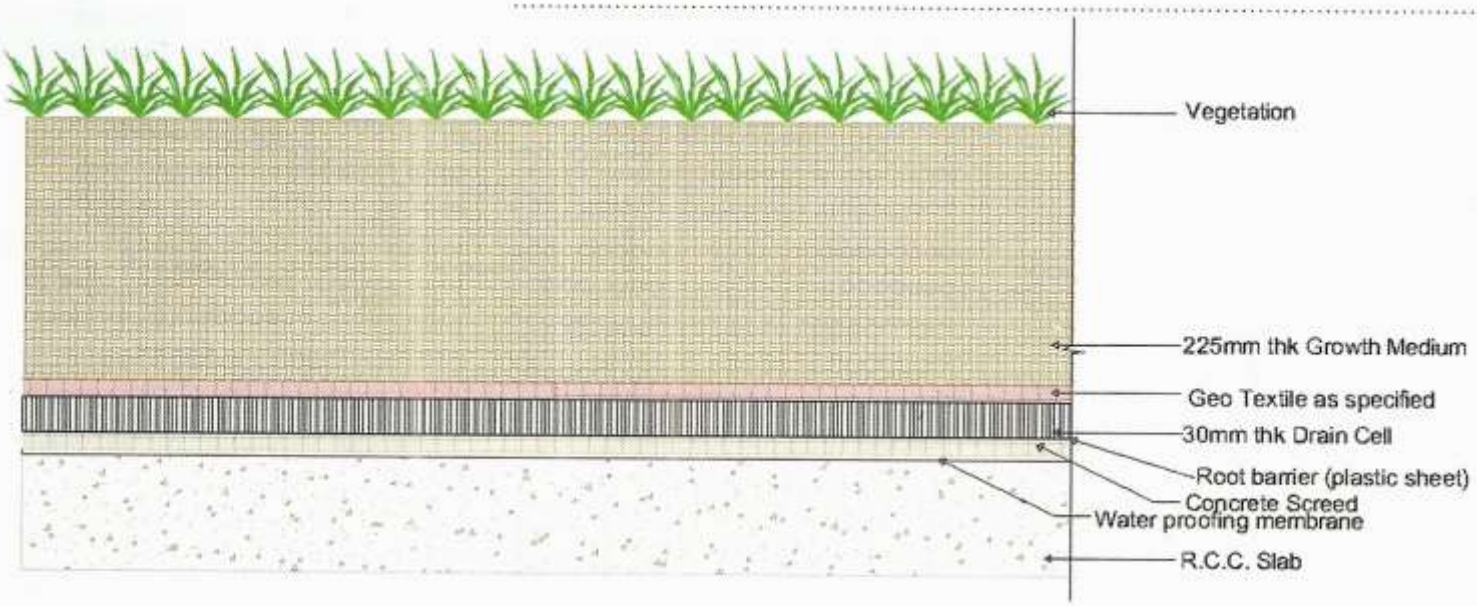
Planting on roof is gaining popularity everywhere as more & more architects are proposing it for mitigating the impact of climate changes. To meet

increasing demand, VYDRO® substrate makes the installation of Green roofs a viable option for newly built as well as old buildings. Traditional growth media used for Green roof can be heavier weighing between 3—10 kg per Sft. VYDRO® offers weight savings of up to 70% compared to standard systems, and is particularly useful for projects where weight and structural strength are critical – for example, in retrofitting older buildings. A one-meter cubed area of VYDRO® substrate weighs just 30kg. The same area covered in lava stone would weigh approximately 1,500kg. After studying & experimenting different aspects of this product, now ELT India is the sole distributor of VYDRO® for Indian Territory. This product is patented technology of Huntsman international.

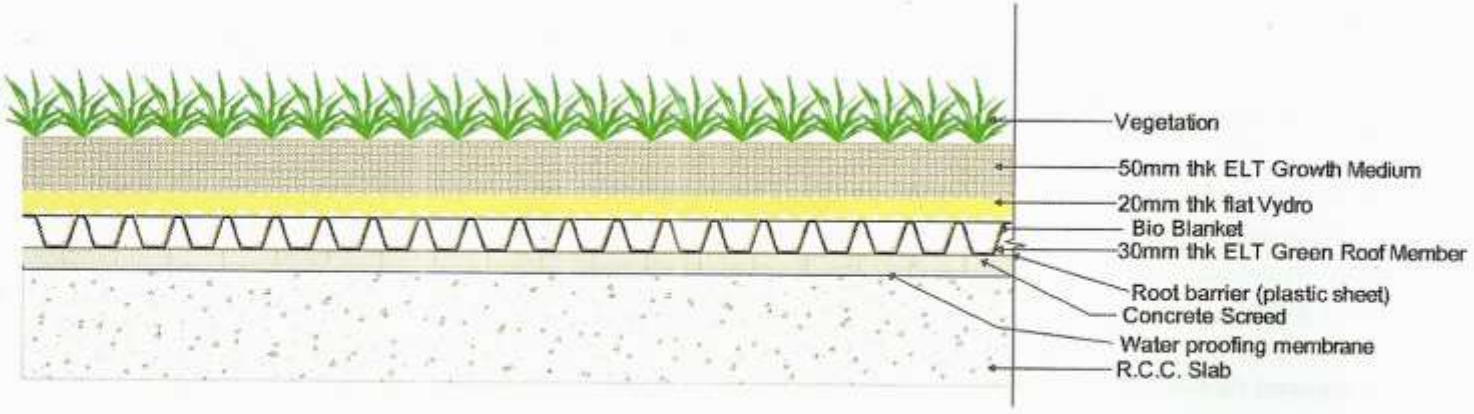
After studying various aspects & challenges involved in growing plants in VYDRO®, ELT India has developed products for using in modern Landscape world.

VYDRO® BASED PRODUCTS:

1. GREEN ROOF



CONVENTIONAL GREEN ROOF WITH DRAINCELL



ELT GREEN ROOF SYSTEM (with VYDRO) (Extensive)

Advantages of VYDRO® based green roof system over conventional green roof system are:

- VYDRO® based system is lighter & lesser in depth
- Easy to install, less water requiring
- Easy to transport & handle
- Uniform water & nutrient distribution
- Enhanced planting possibilities
- Rapid vegetation growth
- Lesser maintenance cost

VYDRO® makes the green roof system compact and supports a healthy growth of plants. This system is suitable for balconies and small terraces of newly constructed as well as old apartments, which may/may not be designed to bear the load of a conventional system. VYDRO® substrate's ability to retain water over longer periods of time has enabled creating landscapes on rooftops or terraces even in hot dry conditions where creating such gardens earlier was ruled out.The weight of VYDRO® based system is 5—8 kgs/sft as against 12—15 kgs/sft of conventional green roof system.

2. GREEN WALL

- VYDRO based green walls are modular systems which are easy to install and maintain, and can be used for aesthetics as well as urban farming.
- ELT proposes to use VYDRO based green walls in two ways; one with the typical ELT India module system and another by directly installing VYDRO on existing wall.
- The plants in VYDRO based green wall can be replaced easily and one can use number of plant varieties for creating different patterns.

3. GREEN CURTAIN

- ELT India uses VYDRO to create semi-permeable screens, to create a visual barrier between two spaces like parking lots, balconies, etc.
- This system comprises of planters of varying lengths connected vertically, suspended from the ceiling or beam with the help of wire ropes.
- VYDRO acts as a substrate in each planter.

4. GREEN STRINGS

- These are rope-like, suspended vertical planters containing VYDRO as a substrate.
- They have an in-built drip irrigation system.
- This innovative product can be used for screening spaces or just as aesthetical elements for indoors as well as outdoors

5. OTHER INNOVATIVE PRODUCTS

6. PLANT VARIETIES AND VYDRO

- ELT India has been experimenting with a number of plant varieties and their survival in VYDRO® substrate.
- Variety of hardwood species, succulents, ornamentals, crops, etc. have been grown in VYDRO® and checked for their survival and growth pattern.
- ELT India's studies show that the growth of plants in VYDRO is healthy, plants require less water and they sustain in extreme climatic conditions.
- Even though VYDRO has ability to retain water, plants are never in water logged condition; as highlighted by the survival of less water requiring varieties like succulents.

Some of the ornamental plant varieties proved to be successful in VYDRO substrate as per experiments done at ELT India, Pune are – Pepromia, Schefflera, Money plant, Philodendrons, Spathiphyllum, Chlorophytum, Pilea, Tradescantia, Ivy, Asparagus springeri, Homalomena, Dracaena, Jade, Impatiens, Lea coccinea burgandi, Cryptanthus, Rhoeo, Dianthus, Ferns, Sedum, etc.
Also, crops such as tomato and chilly; herbs like basil, celery, mint and parsley have been successfully tried in VYDRO.

ROOT GROWTH IN VYDRO FUTURE PROSPECTS AND EXTENDED APPLICATION IN URBAN FARMING

- Plant survival and growth with the use of hydrophilic foam is a Big achievement in Urban farming also as it is best system for retrofit applications. One will be able to us maximum area as the load is no more constraint.
- Bigger shrubbery can also be grown over terrace
- Soilless growth of plants offers advantages like minimal use of insecticides and pesticides for root zone protection, which is a positive aspect for urban farming.

In short one can say VYDRO® is going to revolutionize not only landscape industry but Agriculture as well.

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