

PRE-GROWN VEGETATED MAT

FIELD OF THE INVENTION

5 This invention relates to a pre-grown vegetated mat and a method of producing the same. More particularly, the invention relates to a pre-grown vegetated mat comprising a base layer of impermeable material, a burlap layer, a layer of plant cuttings and/or plants, and a top dressing spreading over the burlap layer, and a method of producing the same.

10

BACKGROUND

Pre-vegetated mats with plant cuttings are typically grown off-site at production facilities before the mats and the plants are transferred to the site to be installed. Many of the
15 pre-grown vegetated mats are made of non-degradable materials, such as interwoven nylon or polymeric mesh. Such mats may pose health and environmental issues.

Some of the pre-growing processes known in the art use cococoir/oil palm fibrous mats or non-degradable polymeric mesh to pre-grow the plants before the mats and the
20 plants are placed on site. The non-degradable polymeric mesh is heat welded onto a 2-dimensional non-woven polymeric surface. These methods of pre-growing the plants are relatively slow as the mats essentially do not contain much water within their fibrous or polymeric materials. Regular watering of the plants will be required throughout the day in order to sustain adequate water within the mats for normal growth of the plants.
25 Such processes are laborious and involved relatively higher production costs. The use of polymeric mesh in the mats also results in relatively higher production costs as compared to using mats fabricated from non-synthetic fibres.

Some methods known in the art uses soil to support the growth of the plants on the
30 mats. Pre-grown vegetated mat with plant cuttings grown in soil has a number of limitations and disadvantages. These include limitations on the exportation of the pre-grown vegetated mat with plant cuttings to other countries as many countries impose restrictions on the importation of soil into the country. Soil that contains contaminants may be classified hazardous waste and therefore it is often subject to restrictions in

transportation. Pre-grown vegetated mat with plant cuttings grown in soil is also extremely heavy and is therefore difficult to transport, handle and apply.

It is therefore desirable to provide a pre-grown vegetated mat and a method of producing the same that seek to address at least one of the problems described hereinabove, or at least to provide alternatives.

SUMMARY OF INVENTION

10 In accordance with a first aspect of this invention, a pre-grown vegetated mat is provided. The pre-grown vegetated mat comprises a base layer of impermeable material; a burlap layer extending over the base layer, and a top dressing spreading over the layer of plant cuttings or as part of the plant cuttings over the burlap layer, the top dressing comprises one or more substances selected from the group consisting of
15 peat moss, coco peat, black loose soil and a combination thereof; and wherein the burlap layer having perforated surface to receive the plant cuttings.

In accordance with one embodiment of this invention, the pre-grown vegetated mat further comprises a top layer of burlap material overlaying the top dressing and/or the
20 layer of plant cuttings.

In accordance with a second aspect of this invention, a method of producing a pre-grown vegetated mat with plant cuttings is provided. The method comprises providing a base layer of impermeable material; laying a burlap layer over the base layer, wherein
25 the burlap layer having perforated surface configured to receive plant cuttings; spreading species of plant cuttings over the burlap layer; optionally adding compost and/or fertilizers over the burlap layer; spreading a top dressing over the plant cuttings or as part of the plant cuttings over the burlap layer; and allowing the species of plant cuttings to grow on the perforated surface of the burlap layer into plants such that the
30 roots of the plant cuttings extend through the perforated surface of the burlap layer and intertwine around the perforations of the burlap layer.

In accordance with one embodiment of this invention, the method further comprises laying a top layer of burlap material over the top dressing and/or the plant cuttings.

In accordance with one embodiment of this invention, the impermeable material is a polymeric plastic material.

5 In accordance with an embodiment of this invention, the burlap layer is provided in the form of a strip. In accordance with another embodiment of this invention, the top layer of burlap material is provided in the form of a strip. In accordance with various embodiments of this invention, the pre-grown vegetated mat is provided in the form of a strip.

10 In accordance with embodiments of this invention, the plant cuttings growing on the burlap layer into plants and having roots extending through the perforated surface of the burlap layer and intertwine around the perforations of the perforated surface of the burlap layer.

15 BRIEF DESCRIPTION OF THE DRAWINGS

The above advantages and features of a method and apparatus in accordance with this invention are described in the following detailed description and are shown in the drawings:

20

Figure 1 is cross-sectional view of a pre-grown vegetated mat according to one embodiment of the present invention.

25 Figure 2 is a cross-sectional view of another embodiment of the pre-grown vegetated mat according to the configuration shown in Figure 1 whereby the top dressing forms part of the plant cuttings.

Figure 3 is an image showing the burlap layer being laid over the base layer of impermeable material according to the embodiment shown in Figure 1.

30

Figure 4 is an image showing an example of the pre-grown mat according to the embodiment shown in Figure 1 with full grown plants.

35 Figure 5 is a cross-sectional view of a pre-grown vegetated mat according to another embodiment of the present invention.

Figure 6 is a cross-sectional view of another embodiment of the pre-grown vegetated mat according to the configuration shown in Figure 5 whereby the top dressing forms part of the plant cuttings.

- 5 Figure 7 is an image showing a top layer of burlap material being laid over the top dressing and plant cuttings according to the embodiment shown in Figure 5.

Figure 8 is an image showing plant cuttings growing healthily out of the perforations of the top layer of burlap material according to the embodiment shown in Figure 5.

10

Figure 9 is an image showing an example of the pre-grown mat with full grown plants according to the embodiment shown in Figure 5.

15

Figure 10 is a cross-sectional view of an exemplary embodiment of the pre-grown mat with full grown plants according to the embodiment shown in Figure 5.

Figure 11 is an image showing an example of several pre-grown mats with full grown plants being laid adjacent to one another in accordance with an embodiment of the invention.

20

Figure 12 is an image showing that plant cuttings growing on coconut fibre mat tend to dry out relatively faster.

25

Figures 13 and 14 are images showing the slow establishment of plant cuttings on coconut fibre mat.

Figure 15 is an image showing that plant cuttings grown on a coconut fibre mat began to rot after several days.

30

Figure 16 is an image showing that the coverage of the plants grown on a coconut fibre mat is less than 100%.

Figure 17 is an image showing that the coverage of the plants grown on the pre-grown vegetated mat of the present invention is about 100%.

35

Figure 18 is an image illustrating another example in which plant cuttings are pre-grown on mat comprising oil palm fibre.

Figure 19 and 20 are images illustrating another example in which plant cuttings are grown on mat comprising polymeric mesh. The images show that plant cuttings grown on polymeric mesh tend to have weeds rampantly growing on the mat.

DETAILED DESCRIPTION

10 The present invention relates to a pre-grown vegetated mat.

Referring to Figure 1, the pre-grown vegetated mat 10 comprises a base layer 12 made of impermeable material, a burlap layer 14 extending over the base layer 12, a layer of plant cuttings 15 overlaying the burlap layer, and a top dressing 16 spreading over the layer of plant cuttings or as part of the plant cuttings over the burlap layer (Figure 2), the top dressing 16 comprises one or more substances selected from the group consisting of peat moss, coco peat, black loose soil and a combination thereof, and wherein the burlap layer having perforated surface configured to receive the plant cuttings.

20

Any suitable impermeable material can be used as the base layer as long as the impermeable material does not allow water to sip through the material. The material also should not allow the roots of the plant cuttings to penetrate through. This is to facilitate the growing of the roots around the perforations of the perforated surface of the burlap layer such that the roots will grow and intertwine with one another and/or around the perforations. This helps to secure the plant cuttings in position and to the mat. In one embodiment, the impermeable material is a polymeric plastic material.

Figure 3 shows an exemplary configuration whereby the burlap layer 14 is laid over the base layer 12. The burlap layer is formed from jute, hemp, or other natural fibres. Jute is a long, soft, shiny vegetable fibre that can be spun into coarse, strong threads. Jute is produced primarily from plants in the genus *Corchorus*. The fibres of the jute are used to weave into the material forming the burlap layer. The jute is first dried and the dried fibres from the jute are then processed to form a regular, loosely woven perforated material for forming the burlap layer of the pre-grown vegetated mat. The

perforated surface of the burlap layer helps to secure the plant cuttings in position when the plant cuttings are spread onto the burlap layer.

As the plant cuttings grow on the burlap layer into plants 20, the roots of the plant cuttings penetrates through the perforated surface of the burlap layer and intertwine with one another and/or around the perforations of the perforated surface of the burlap layer. This helps to secure the plants more firmly to the mat and this in turn, facilitates transportation of the pre-grown vegetated mat. The perforations can be of any suitable shapes, sizes and layout. In one embodiment, the perforations are substantially circular in shape and each perforations has an average diameter of 0.1 to 8.0 mm, preferably 0.5 to 3.0 mm. In other embodiments, the perforations are of other shapes and each perforation has an average aperture dimension of 15 to 25 mm in length and 15 to 25 mm in width.

The burlap layer has good water retention. The burlap layer made of burlap material helps to retain water. The impermeable base layer further facilitates the retention of the water within the mat. This reduces the need to water the plants on a regular basis. Any suitable grade of burlap material may be used as long as it is able to retain water by up to 50 to 70% or able to maintain the pre-grown vegetated mat in a rolled up position for 12 hours to 2.5 days without compromising the quality of the plant cuttings.

The layer of plant cuttings overlaying the burlap layer covers substantially the entire surface area of the burlap layer. Plant cuttings are preferred in the present invention as compared to plant seeds because plant cuttings grow relatively better and faster in tropical climate as compared to plant seeds.

“Plant cuttings” as used herein refers to pieces of plants that are used in horticulture for vegetative propagation. The pieces may include the stem, root and/or leaves of a source plant.

30

Any suitable plant cuttings can be used. The species used for the plant cuttings can be of any suitable type as long as the plant cuttings are able to withstand the climate that they are grown in. In some exemplary embodiments, the species include, but are not limited to, sedum sarmentosum, sedum mexicanum, portulaca oleracea, portulaca grandiflora, portulaca pilosa, axonopus compressus, pearl grass, carpet grass, callisia

35

repens, plectranthus species, alternanthera species, wedelia trilobata, dissotis rotundifolia, piper sarmentosum, cyanotis cristata, cyanotis axillaris, cyanotis obtusa, stenotaphrum secundatum variegated and stenotaphrum secundatum green. The plant cuttings can be provided in any suitable forms, shapes and sizes. The plant cuttings grow on the burlap layer into plants. "Plants" as used herein refers to plants that are grown from the species of plant cuttings, including garden plants and grass.

In one embodiment, the top dressing spreading over the layer of plant cuttings covers a predominant surface area of the burlap layer, ranging from 50% to 100% of the surface area of the burlap layer. The top dressing is applied over the plant cuttings to provide additional nutrients to the plant cuttings. In another embodiment, top dressing is spread over the burlap layer as part of the layer of plant cuttings.

Figure 4 shows an example of a pre-grown mat with full grown plants in accordance with the embodiment shown in Figure 1.

Referring now to Figure 5, the pre-grown vegetated mat further comprises a top layer of burlap material 18 overlaying the top dressing 16 and/or the layer of plant cuttings 15. The top layer is also made from burlap material. It can be made from the same grade of burlap material as the burlap layer or of a different grade. The top layer of burlap material 18 have loosely woven perforated surface. The perforations can be of the same configuration as the burlap layer 14 or of different shapes, sizes and layout. In one embodiment, the perforations are substantially circular in shape and each perforation has an average diameter of 0.1 to 8.0 mm, preferably 0.5 to 3.0 mm. In other embodiments, the perforations are of other shapes and each perforation has an average aperture dimension of 15 to 25 mm in length and 15 to 25 mm in width. The perforations should have a size sufficient to allow the plant cuttings from underneath the top layer to grow healthily out from the perforations of the top layer and to provide sufficient coverage for the plant cuttings. Figure 7 shows an example of the top layer of burlap material 18 being laid over the top dressing 16 and the layer of plant cuttings 15. The top layer of burlap material provides the initial protective cover over the plant cuttings spreading over the burlap layer. The top layer prevents the plant cuttings from being wash away in adverse climatic conditions. The top layer also prevents or minimizes weeds from growing. The added layer increases the water retention capability of the pre-grown vegetated mat. This further reduces the need to water the

plants on a regular basis. The added layer allows more nutrients to be spread over the pre-grown mat and this provides additional nutrients for the newly grown plants. Figure 8 is an example showing plant cuttings growing healthily out of the perforations of the top layer of burlap material into plants 20 according to the embodiment shown in Figure 5. Figure 9 shows an example of the pre-grown vegetated mat according to the embodiment shown in Figure 5 with full grown plants 20. Figure 10 shows the cross-sectional view of the pre-grown vegetated mat 10 with full grown plants 20 in accordance with an embodiment of the present invention.

- 10 The burlap layer extending over the base layer can be of the same size and shape as the base layer or it can be of a different size and shape as the base layer. The top layer of burlap material can be of the same size and shape as the burlap layer or it can be of a different size and shape. Preferably, the top layer of burlap material is of the same size and shape as the burlap layer to maximize the coverage over the layer of plant
15 cuttings spread over the burlap layer.

In one embodiment, the base layer 12 is provided in a form of a sheet that when applies to a terrain, it spreads across the terrain. The burlap layer 14 and the top layer of burlap material 18 are provided in the form of strips. In another embodiment, the
20 base layer 12, the burlap layer 14 and the top layer of burlap material 18 are provided in the form of a strip. The configurations of the various layers in strips help to facilitate the process of pre-growing the plant cuttings on the mat and transporting the mat with the plant cuttings and/or plants to the site for installation. In one embodiment, the strip has a width of 0.3 to 2.0 m, preferably 0.3 to 1.5 m, more preferably 0.3 to 1.2 m, even
25 more preferably 0.3 to 1.0 m and most preferably 0.3 to 0.5 m. The strip can be of any suitable length. In one embodiment, the strip has a length of 4 to 12 m.

Preferably, the base layer 12 of the pre-grown vegetated mat has a thickness of 1 to 10 mm, preferably 1 to 3 mm. The burlap layer 12 and the top layer of burlap material 18
30 each have a thickness of 5 to 10 mm. The thickness of the layers will affect the costs and the weight of the pre-grown vegetated mat. These are some of the factors that the inventors consider when choosing the materials for fabricating the pre-grown vegetated mat.

In another embodiment, the burlap layer may be an interwoven layer comprising two or more layers made of burlap material, wherein the two or more layers superimpose with one another to form a single integral layer. This embodiment enables one to fabricate a burlap layer according to the desired dimensions of the perforations using existing burlap materials, to cater to the different species of plant cuttings growing on the mat. The overall thickness of the pre-grown vegetated mat of this configuration varies according to the number of layers of burlap material used to make the burlap layer.

In the various embodiments described hereinabove, the overall thickness of the pre-grown vegetated mat comprising the base layer, the burlap layer, the layer of plant cuttings and the top dressing ranges from 30 to 50 mm. The overall thickness of the pre-grown vegetated mat comprising the base layer, the burlap layer, the layer of plant cuttings, the top dressing and the top layer of burlap material ranges from 30 to 55mm. This thickness is relatively thinner as compared to some vegetated mats known in the state of the art (which may be around 50 to 75 mm). The reduced thickness reduces the overall weight of the pre-grown vegetated mat.

In another aspect of the invention, a method of producing a pre-grown vegetated mat with plant cuttings is provided. The method comprises providing a base layer 12 made of impermeable material. A burlap layer 14 made of burlap material is then laid over the base layer 12, wherein the burlap layer having perforated surface configured to receive plant cuttings. Species of plant cuttings 15 is spread over the burlap layer 14. Optionally, compost and/or fertilizers may be added to the plant cuttings. Examples of compost that may be used include, but are not limited to, cococoir, tree bark, mulch and peat moss from raised bogs. Any suitable types of fertilizers may be used. The fertilizers are provided to kick start the growing process of the plant cuttings.

After the plant cuttings are spread over the burlap layer, a top dressing 16 is applied over the plant cuttings or as part of the plant cuttings over the burlap layer. The top dressing may comprise one or more substances selected from the group consisting of peat moss, coco peat, black loose soil and a combination thereof.

The species of plant cuttings are then allowed to grow on the perforated surface of the burlap layer. The plant cuttings grow in such a way that the roots of the plant cuttings extend through the perforated surface of the burlap layer and intertwine around the

perforations of the burlap layer. Due to the impermeable nature of the base layer, the roots of the plant cuttings are not able to penetrate through the base layer. As a result, the roots of the plant cuttings grow and extend horizontally within the space between the base layer and the burlap layer. As the roots of the plant cuttings grow longer, the roots intertwine with one another, with some roots latching themselves onto the perforated surface of the burlap layer. Figure 10 is an exemplary embodiment showing how the roots of the plants intertwine with one another and with the perforated surface of the burlap layer 14. This firmly secures the plants 20 to the burlap layer 14 and holds the plants 20 in place. The plants 20 may be secured to the burlap layer 14 in uniformly spaced locations or in a random manner.

In one embodiment, the method further comprises laying a top layer of burlap material 18 over the top dressing 16 and/or the plant cuttings 15. The top layer of burlap material should be of a size sufficient to cover substantially the entire layer of the top dressing and/or the plant cuttings to provide maximum coverage over the top dressing and/or the plant cuttings. In this embodiment, the plant cuttings grow from beneath the top layer of burlap material and penetrate through the perforations of the top layer of burlap material. The perforations should have a size sufficient to allow the plant cuttings from beneath the top layer of burlap material to grow healthily out from the perforations of the top layer and to provide sufficient coverage for the plant cuttings. The method may further include spreading another layer of dressing comprising nutrients over the top layer of burlap material to provide additional nutrients for the plants growing out from the top layer.

Once the plants are fully grown, the plants are ready to be harvested. Figure 9 shows an example of how the pre-grown vegetated mat looks when the plants are fully grown on the pre-grown vegetated mat. Harvesting of the plants involves rolling up the pre-grown vegetated mat. In the embodiment in which the base layer and the burlap layer are provided in the form of a strip, the base layer and the burlap layer, together with the plants, are rolled up together. In the embodiment in which the burlap layer is provided in the form of a strip, the burlap layer together with the plants is rolled up, without the base layer. In the embodiments comprising the top layer, the top layer, the burlap layer and the base layer, together with the plants, are rolled up together. In another embodiment in which the base layer is not provided in the form of a strip, the top layer and the burlap layer, together with the plants, are rolled up together. Providing the pre-

grown vegetated mat in strip form eliminates the need to cut the mat to size before rolling up the mat. This makes the process of harvesting relatively faster and easier, and less labour-intensive. The typical weight for each strip of the mat ranges from 1 to 5 kg/m², depending on the moisture content of the burlap layer and the top layer of burlap material. This is significantly lighter than those known in the art, which are typically in the range of 10 to 15 kg/m² (for mat made of, for example, coconut fiber), and 25 to 35 kg/m² (for mat made of, for example, polymeric mesh).

In the various embodiments, the pre-grown vegetated mat is irrigated with an aqueous solution to prevent the mat from drying out. The frequencies of irrigation vary, depending upon the climatic conditions of the region. In an exemplary embodiment, the pre-grown vegetated mat is irrigated with an aqueous solution at least once a day. Any suitable type of aqueous solution may be used including, but is not limited to, water, recycled water from holding pond, water containing organic enzymes, etc.

Providing the pre-grown vegetated mat in strip form also allows the mat to be changed with relative ease when the need arises, particularly when the vegetation on the mat withered or needed to be replaced with another type of vegetation. This allows different types of species to grow on a single terrain. This method is useful when there is a need to provide different species for beautifying the terrain or any other purposes.

In general, the pre-grown vegetated mat of the present invention can be used for a variety of purposes. For example, it can be laid on terrains with soil or on surfaces without soil, for example, on roof top. In the embodiment in which the pre-grown vegetated mat is laid on terrains with soil, the mat is first unrolled and the base layer of impermeable layer is removed before the mat is laid on the terrain. Further plant cuttings and soil may be spread over the burlap layer such that the section of the terrain is quickly vegetated. As the plants continue to grow, the roots of the plants will grow into the soil of the terrain and thereby securing the pre-grown vegetated mat with the plants more firmly to the terrain. In the embodiment in which the pre-grown vegetated mat is laid on surfaces without soil, the mat is simply unrolled and laid onto the surfaces without the need to remove the base layer made of impermeable layer.

In another aspect of the present invention, a method of producing a plurality of pre-grown vegetated mats with plant cuttings is provided. The method comprises providing

a base layer made of impermeable material and laying a first batch of two or more strips of burlap layer over the base layer in a spaced-apart manner, wherein each of the strips of the burlap layer having perforated surface configured to receive plant cuttings. Species of plant cuttings are spread over each of the strips of the burlap layer.

5 Optionally, compost and/or fertilizers may be added to the plant cuttings.

After the plant cuttings are spread over the strips of burlap layer, a top dressing is applied over the plant cuttings on each strip of the burlap layer or as part of the plant cuttings over the burlap layer. In another embodiment, the method further comprises
10 laying a top layer of burlap material over the top dressing and/or the plant cuttings on each strip of the burlap layer. Each mat comprising the various layers is irrigated with an aqueous solution to prevent the mat from drying out.

The species of plant cuttings are then allowed to grow on the perforated surface of
15 each strip of the burlap layer in the same manner as described hereinabove.

Before the plants are harvested, a second batch of two or more strips of burlap layer is laid over the base layer, with each strip of the second batch being placed between two adjacent strips from the first batch. This allows the species of plant cuttings from the
20 first batch of the burlap layer to grow over to the second batch of strips of burlap layer. Once the plant cuttings from the first batch of burlap layer are ready to be harvested, the first batch of burlap layer is rolled up and a new batch of two or more strips of burlap layer is provided to take its place. This makes the process of harvesting relatively faster and more cost effective as less plant cuttings are required for each new
25 batch of burlap layer. Figure 11 shows an example of several pre-grown mats with full grown plants being laid adjacent to one another.

The method of the present invention provides a simplified way of pre-growing vegetation on a pre-grown vegetated mat before the vegetation is transported to a
30 desired location. The method is less labour-intensive as compared to traditional method of growing vegetation as the plant cuttings in the present invention are able to grow on the mat with minimal supervision and intervention. The method requires fewer steps in growing vegetation on the pre-grown vegetated mat.

The pre-grown vegetated mat of the present invention can be easily rolled up for storage and/or for transportation. One of the factors contributing to this advantage is that the roots of the plant cuttings do not penetrate through the impermeable base layer and this allows easy removal of the mat from the site at which the mat is placed to pre-grow the plant cuttings. Another factor contributing to this advantage is that the pre-grown vegetated mat is relatively thinner and lighter due to the materials used to form the various layers of the mat. The burlap material used to produce the pre-grown vegetated mat is relatively lighter as compared to conventional mats formed from 3-dimensional polymeric mesh which is heat welded onto a 2-dimensional non-woven polymeric layer.

The burlap layer and the top layer of the mat have a higher water retention capability due to the burlap material used to form the layers. This allows the pre-grown vegetated mat to be rolled up, stored and transported without having to compromise the quality of the plants. The mat can be rolled up in this manner for as long as 12 hours to 2.5 days without compromising the quality of the plants.

Comparing a mat made from burlap material to a coir mat or other organic mat material, the pre-grown vegetated mat of the present invention has a better water retention capacity and allows the plant cuttings to grow 2 to 3 times faster and at a higher survival rate to form the vegetated mat. The pre-grown vegetated mat of the present invention requires only a very thin layer of the top dressing as compared to one using coir mat or other forms of net that requires multiple times of thick and heavy top dressing to be applied onto the mat. This has implications on the costs in the form of material and labour costs. Due to the nature of dependence on labour for forming a top layer that is even and thick, in the event that the top layer for coir mat is not done properly, the vegetated mat will not have a 100% coverage, maybe only 70-80% coverage within a given standard period of time. This is because the area of the coir mat that does not have the top dressing will be too dry. This will not allow any form of roots to grow there.

The pre-grown vegetated mat of the present invention is soilless. The mats are easy to transport, store and handle. The perforated surface of the burlap layer facilitates the growing of the plant cuttings on the burlap layer and this in turn allows the pre-grown vegetated mat to be transported easily without running into the risk of having the

vegetation falling out from the mat. The pre-grown vegetated mat has greatly improved storage characteristics. Due to the relatively higher water retention capability, it reduces the frequency of watering of the plant cuttings. This reduces labour costs, increases efficiency and reliability. The pre-grown vegetated mat of the present invention is also environmentally friendly as the burlap layer and the top layer made of burlap material will disintegrate within about 60 days.

The following examples illustrate various embodiments of this invention. One skilled in the art will recognize that the examples set out below are not an exhaustive list of the embodiments of this invention.

EXAMPLE

Example 1

Pre-grown vegetated mat made of coconut fibre (or cocomat) was prepared and allowed to grow under the same condition as the pre-grown vegetated mat of the present invention. The results obtained after 40 days of growth are shown in Figures 12 to 16.

Figure 12 shows that after 7 days, the plant cuttings grew on the coconut fibre mat dried out (201) relatively faster as compared to the pre-grown vegetated mat of the present invention. Due to its inability to retain sufficient water on the mat, the growth of the plants was relatively slower as compared to the mat of the present invention even though the same species of plant cuttings were used and grew under the same conditions. Figures 13 and 14 show the slow establishment (301, 401) of the plants on the coconut fibre mat. Figure 15 shows that the plants grown on the coconut fibre mat began to rot (501) after 7 days.

The results also show that the coverage of plants growing on the coconut fibre mat is not 100%, as can be seen in Figure 16 (601). Conversely, in the present invention, the coverage of plants growing on the mat of the present invention is about 100%. This is clearly shown in Figure 17.

The pre-grown vegetated mat fabricated from coconut fibres tend to be quite hard and does not decompose well. The mat of this nature is able to last 3-10 years, making it relatively harder to sustain when installed on green roof.

5 Example 2

Figure 18 shows another example in which plant cuttings are pre-grown on a mat comprising oil palm fibre. The growth of the plants on such mat is not uniform (801) as some areas of the mat may become drier than other areas, resulting in a slower
10 establishment of the plants.

Example 3

Figures 19 and 20 each shows an example in which plant cuttings are grown on a mat
15 comprising polymeric mesh. The images show that plant cuttings grow on polymeric mesh tend to have weeds (901, 101) rampantly growing on the mat.

The above is a description of the subject matter the inventors regard as the invention and is believed that those skilled in the art can and will design alternative embodiments
20 that include of this invention as set forth in the following claims.

Claims:

1. A pre-grown vegetated mat comprising:
a base layer of impermeable material;
5 a burlap layer extending over the base layer;;
a layer of plant cuttings overlaying the burlap layer; and
a top dressing spreading over the layer of plant cuttings or as part of the plant cuttings over the burlap layer, the top dressing comprises one or more substances selected from the group consisting of peat moss, coco peat, black loose soil and a
10 combination thereof; and
wherein the burlap layer having perforated surface configured to receive the plant cuttings.
2. The pre-grown vegetated mat according to claim 1, further comprising:
15 a top layer of burlap material overlaying the top dressing and/or the layer of plant cuttings.
3. The pre-grown vegetated mat according to claim 1 or 2, wherein the impermeable material is polymeric plastic material.
20
4. The pre-grown vegetated mat according to claim 1, wherein the burlap layer having a thickness of 5 to 10 mm.
5. The pre-grown vegetated mat according to claim 2, wherein the top layer of
25 burlap material having a thickness of 5 to 10 mm.
6. The pre-grown vegetated mat according to claim 1, wherein the base layer having a thickness of 1 to 10 mm, preferably 1 to 3 mm.
- 30 7. The pre-grown vegetated mat according to claim 1, wherein the burlap layer is provided in the form of a strip.
8. The pre-grown vegetated mat according to claim 2, wherein the top layer of burlap material is provided in the form of a strip.

9. The pre-grown vegetated mat according to claim 1, wherein the pre-grown vegetated mat is in the form of a strip.

10. The pre-grown vegetated mat according to claim 1 or 9, wherein the pre-grown vegetated mat having a length of 4 to 12 m.

11. The pre-grown vegetated mat according to claim 9 or 10, wherein the pre-grown vegetated mat having a width of 0.3 to 2.0 m.

12. The pre-grown vegetated mat according to claim 9, wherein the strip has a weight of 1 to 5 kg/m².

13. The pre-grown vegetated mat according to claim 1 or 2, wherein the plant cuttings growing on the burlap layer into plants and having roots extending through the perforated surface of the burlap layer and intertwine around the perforations of the perforated surface of the burlap layer.

14. The pre-grown vegetated mat according to claim 1 or 13, wherein the plants are garden plants or grass.

15. The pre-grown vegetated mat according to claim 1 or 2, wherein the pre-grown vegetated mat having an overall thickness of 30 to 50 mm.

16. The pre-grown vegetated mat according to claim 1, wherein the burlap layer comprises two or more layers made of burlap material, the two or more layers superimpose with one another to form a single integral layer disposed between the base layer and the layer of plant cuttings.

17. A method of producing a pre-grown vegetated mat with plant cuttings, the method comprising:

providing a base layer of impermeable material;

laying a burlap layer over the base layer, wherein the burlap layer having perforated surface configured to receive plant cuttings;

spreading species of plant cuttings over the burlap layer;

optionally adding compost and/or fertilizers over the burlap layer;

spreading a top dressing over the plant cuttings or as part of the plant cuttings over the burlap layer; and

allowing the species of plant cuttings to grow on the perforated surface of the burlap layer into plants such that the roots of the plant cuttings extend through the perforated surface of the burlap layer and intertwine around the perforations of the burlap layer.

18. The method according to claim 17, further comprising:

laying a top layer of burlap material over the top dressing and/or the plant cuttings.

19. The method according to claim 17 or 18, wherein the top dressing comprises one or more substances selected from the group consisting of peat moss, coco peat, black loose soil and a combination thereof.

20. The method according to claim 17 or 18, wherein the impermeable material is polymeric plastic material.

21. The method according to claim 17, wherein the burlap layer having a thickness of 5 to 10 mm.

22. The method according to claim 18, wherein the top layer of burlap material having a thickness of 5 to 10 mm.

23. The method according to claim 17, wherein the base layer having a thickness of 1 to 10 mm, preferably 1 to 3 mm.

24. The method according to claim 17 or 18, wherein the pre-grown vegetated mat having an overall thickness of 30 to 50 mm.

25. The method according to claim 17, wherein the burlap layer is provided in the form of a strip.

26. The method according to claim 18, wherein the burlap layer and the top layer of burlap material are each provided in the form of a strip.

27. The method according to claim 25 or 26, wherein the base layer is provided in
5 the form of a strip.

28. The method according to claim 17, wherein the pre-grown vegetated mat having a length of 4 to 12 m.

10 29. The method according to claim 17 or 28, wherein the pre-grown vegetated mat having a width of 0.3 to 2.0 m.

30. The method according to claim 17, wherein the laying of the burlap layer comprises laying two or more burlap layers that are superimposed with one another to
15 form a single integral layer.

31. The method according to claim 17 or 18, wherein the plants are garden plants or grass.