

A SYSTEM FOR GROWING A PLANT FROM SEED TO MATURITY**TECHNICAL FIELD**

[0001] An aspect of the disclosure relates to a system for growing a plant from seed to maturity in the same soil container. Another aspect of the disclosure relates to a method for growing a plant from seed to maturity in the soil container without transplanting. Another aspect of the disclosure relates to a plant growing unit for growing a plant from seed to maturity.

BACKGROUND

[0002] There is an increasing need to produce edible plants locally in an urban environment. However, particularly in an urban environment, there is not enough space for doing so and many people, who are interested in growing plants at home, do not have sufficient time to care for the growth of the edible plants when starting from seeds. Especially tasks such as regular watering of the growing plant and transplanting the seed once it has germinated require a lot of time and care. Moreover, many existing starter kits for assisting in the plant growing process require the use of electricity, which is, however, a limited and depleting resource.

[0003] For example, the National Parks Board (Singapore) published a video for assisting hobby gardeners to grow plants in their own homes (link to the video: <https://www.facebook.com/nparksbuzz/videos/708971626535520/>). The method for growing edible plants in an urban environment as described by the National Parks video recommends germinating seeds on a seedling tray for increasing the germination rate. Further, the video by the National Parks Board, recommends growing seedling in a smaller pot and transferring to a bigger pot later for growing into adult plants. However, additional labor, time and skills are needed to successfully transplant the germinated seed into a suitable soil container. Moreover, in the instructions from the National Parks Board, watering is to be carried out daily, which would also require more labor and time. Additionally, fertilizing once a week requires, again, more labor and time.

[0004] For this reason, individuals, although interested in growing their own edible plants, would find it difficult and labor intensive to grow their own edible plants as the failure rate is often high for them, because time and skills are needed. They would often dismiss the idea of growing their own edible plants, e.g., thinking that they may not have the necessary skills for doing so or not having a conducive environment in their home to grow vegetables, or they would not have the time required for doing so.

[0005] Thus, there appears to be a need for a system, a method and a plant growing unit, which eliminates or at least ameliorates the disadvantages of conventional plant growing strategies as discussed herein before.

SUMMARY

[0006] In a first aspect, there is provided a system for growing a plant from seed to maturity. The system may include a soil container containing soil, wherein the soil is filled to a level not more than 75% of a height of the soil container, wherein the soil container, at least above the level of the soil, is non-opaque. The system may include a liquid container containing an aqueous liquid. The system may further include a wicking string fluidly connecting the aqueous liquid in the liquid container to a topsoil layer of the soil in the soil container. The soil container, the liquid container and the wicking string together may support growing of the plant from seed to maturity without transplanting, whereby the plant grows from a seed to a seedling and from the seedling to a mature plant in the soil container.

[0007] In a second aspect, there is provided a method for growing a plant from seed to maturity with the system as described above. The method may include the step of filling the soil container with the soil to the level not more than 75% of the height of the soil container. The method may include the step of placing the seed on or in the topsoil layer of the soil container. The method may include the step of filling the liquid container with the aqueous liquid. The method may include the step of disposing the wicking string to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container. The method may include the step of germinating the seed in the soil container. The method may include the step of growing the plant to maturity in the soil container without transplanting.

[0008] In a third aspect, there is provided a plant growing unit for growing a plant from seed to maturity. The plant growing unit may include a soil container defining an interior space for holding soil. The plant growing unit may include a liquid container defining an interior space for holding liquid. The plant growing unit may include a wicking string extending from within the interior space of the liquid container through a base of the soil container into the interior space of the soil container. A segment of the wicking string inside the soil container may have a length, measured from the base of the soil container to a first end of the wicking string inside the soil container, that is equal to or longer than 25% of a height of the soil container. At least an upper portion of the soil container may be non-opaque, wherein the upper portion may extend from a rim of the soil container to 75% or lower of the height of the soil

container. A second end of the wicking string inside the liquid container may be in contact with a base of the liquid container.

[0009] In a fourth aspect, there is provided a system for growing a plant from seed to maturity. The system may include a soil container containing soil, wherein the soil is filled to a level not more than 75% of a height of the soil container, wherein the soil container, at least above the level of the soil, is non-opaque. The system may include a liquid container containing an aqueous liquid. The system may further include a tube with a drip valve capable of fluidly connecting the aqueous liquid in the liquid container to a topsoil layer of the soil in the soil container. The soil container, the liquid container and the tube with the drip valve together support growing of the plant from seed to maturity without transplanting, whereby the plant grows from a seed to a seedling and from the seedling to a mature plant in the soil container.

[0010] In a fifth aspect, there is provided a method for growing a plant from seed to maturity with the system as described in the fourth aspect. The method may include the step of filling the soil container with the soil to the level not more than 75% of the height of the soil container. The method may include the step of placing the seed on or in the topsoil layer of the soil container. The method may include the step of filling the liquid container with the aqueous liquid. The method may include the step of disposing the tube with the drip valve to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container. The method may include the step of germinating the seed in the soil container. The method may include the step of growing the plant to maturity in the soil container without transplanting.

[0011] In a sixth aspect, there is provided a plant growing unit for growing a plant from seed to maturity. The plant growing unit may include a soil container defining an interior space for holding soil. The plant growing unit may include a liquid container defining an interior space for holding liquid. The plant growing unit may include a tube with a drip valve extending from within the interior space of the liquid container into the interior space of the soil container. A segment of the tube inside the soil container has a length, measured from the rim of the soil container to a first end of the tube inside the soil container, that is equal to or longer than 95% of a height of the soil container. At least an upper portion of the soil container may be non-opaque, wherein the upper portion may extend from a rim of the soil container to 75% or lower of the height of the soil container. A second end of the tube may be in contact with a base of the liquid container.

[0012] In a seventh aspect, there is provided a system for growing a plant from seed to maturity. The system may include a soil container containing soil, wherein the soil is filled to a level not more than 75% of a height of the soil container, wherein the soil container, at least above the level of the soil, is non-opaque. The system may include a liquid container containing an aqueous liquid. The system may further include a tube with a spray valve and a first end and a second end, the first end of the tube capable of spraying an aqueous liquid to a topsoil layer of the soil in the soil container. The soil container, the liquid container and the tube with the spray valve together support growing of the plant from seed to maturity without transplanting, whereby the plant grows from a seed to a seedling and from the seedling to a mature plant in the soil container.

[0013] In an eighth aspect, there is provided a method for growing a plant from seed to maturity with the system as described in the seventh aspect. The method may include the step of filling the soil container with the soil to the level not more than 75% of the height of the soil container. The method may include the step of placing the seed on or in the topsoil layer of the soil container. The method may include the step of disposing the tube with the spray valve to spray the aqueous liquid from the first end to the topsoil layer of the soil in the soil container. The method may include the step of germinating the seed in the soil container. The method may include the step of growing the plant to maturity in the soil container without transplanting.

[0014] In a ninth aspect, there is provided a plant growing unit for growing a plant from seed to maturity. The plant growing unit may include a soil container defining an interior space for holding soil. The plant growing unit may include a tube with a spray valve and a first end and a second end, the first end of the tube capable of spraying an aqueous liquid into the interior space of the soil container. At least an upper portion of the soil container may be non-opaque, wherein the upper portion may extend from a rim of the soil container to 75% or lower of the height of the soil container. A second end of the tube may be contactable with a source of an aqueous liquid.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The invention will be better understood with reference to the detailed description when considered in conjunction with the non-limiting examples and the accompanying drawings, in which:

[0016] **FIG. 1** schematically shows a system 100 according to embodiments of the disclosure.

[0017] **FIG. 2** schematically shows a system 200 according to embodiments of the disclosure.

[0018] **FIG. 3** schematically shows a system 300 according to embodiments of the disclosure.

[0019] **FIG. 4** schematically shows a system 400 according to embodiments of the disclosure.

[0020] **FIG. 5** schematically shows a system 500 according to embodiments of the disclosure.

[0021] **FIG. 6** schematically shows a simplified flow diagram for an exemplary method according to an aspect of the present disclosure.

[0022] **FIG. 7** schematically shows a plant growing unit 700 according to embodiments of the disclosure.

[0023] **FIG. 8** schematically shows a system 800 according to embodiments of the disclosure.

[0024] **FIG. 9** schematically shows a simplified flow diagram for an exemplary method 900 according to an aspect of the present disclosure.

[0025] **FIG. 10** schematically shows a plant growing unit 1000 according to embodiments of the disclosure.

[0026] **FIG. 11** schematically shows a system 1100 according to embodiments of the disclosure.

[0027] **FIG. 12** schematically shows a simplified flow diagram for an exemplary method 1200 according to an aspect of the present disclosure.

[0028] **FIG. 13** schematically shows a plant growing unit 1300 according to embodiments of the disclosure.

[0029] **FIG. 14A-14G** show step-by-step instructions on implementing a system according to one Example of the present disclosure.

[0030] **FIG. 15A-15B** show photographic evidence of a system according to one Example of the present disclosure.

[0031] **FIG. 16A-16D** show photographic evidence of a system according to one Example of the present disclosure.

[0032] **FIG. 17A-17D** show photographic evidence of a system according to one Example of the present disclosure.

[0033] **FIG. 18A-18B** show photographic evidence of a system according to one Example of the present disclosure.

[0034] **FIG. 19** shows photographic evidence of a system according to one Example of the present disclosure.

DETAILED DESCRIPTION

[0035] The following detailed description refers to the accompanying drawings that show, by way of illustration, specific details and embodiments in which the disclosure may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the disclosure. Other embodiments may be utilized and structural, and logical changes may be made without departing from the scope of the disclosure. The various embodiments are not necessarily mutually exclusive, as some embodiments can be combined with one or more other embodiments to form new embodiments.

[0036] The present disclosure relates to a system, a method and a plant growing unit to simplify and increase the success of growing edible plants, particularly in a domestic urban environment. The system, method and plant growing unit enables the growing of a seed via seedling (young plant) to a mature plant without the need for transplanting, frequent watering, frequent fertilizing or any electricity. As described hereinbefore, disadvantages encountered in conventional plant growing systems include low germination success rates and/or a high amount of labor, time or electricity consumed during the plant growing process.

[0037] To address the above insufficiencies, the present disclosure provides, in one aspect, a system for growing a plant from seed to maturity. One of the main advantages the system provides is the possibility to grow a mature plant from the seed in only one soil container. This advantage eliminates the need for transplanting, which is associated with additional labor, time and a lower rate of success due to a lack of transplanting skill by the individual. Generally, the advantages may be the result of a synergistic combination between a soil container and a self-watering mechanism.

[0038] For the purpose of this disclosure, a “seed” is generally referred to as being in a dormant stage, waiting to be further developed by initiation of a germination process. The germination process can be characterized to involve absorption of water (and other environmental factors), allowing the seed to germinate. A “germinating seed”, a “seedling” or “developing seed” may be characterized as a seed that has started the process of growth and development into a mature plant, indicating that under the influence of water absorption and

other environmental factors, germination has started already. A “mature plant”, as referred to herein, may be a plant that has reached its full size for that particular species. “Growing a plant to maturity”, in line with the above, may refer to the process of growing the plant to the stage where it is a mature plant. For leafy vegetables like lettuce or spinach, this may be when the plant has developed a sufficient number of mature leaves. For fruiting vegetables like tomatoes or peppers, it is when the plant has developed mature and fully-formed fruits. The point at which a vegetable plant is considered a mature plant may also be related to the size of the plant when it is ready for harvest. For leafy greens, this may be when the leaves are tender and flavorful, but before they start to bolt (go to seed). For ornamental plants, a mature plant may be regarded as a plant that blossoms or has flowers. In the following will be described how this particular advantage is achieved by describing the system in more detail.

[0039] As illustrated in the system 100 shown in FIG. 1, the system 100 may include a soil container 110. The soil container 110 may be a main body defining an interior space suitable for holding material, e.g., soil 120 and a seed 150, therein. While the soil container 110 is exemplary shown in FIG. 1 in the shape of an open cylinder, the soil container 110 may be in any shape selected from the group consisting of an open cylinder, open cube, open sphere, open pyramid, and an open prism. Each of these shapes may have at least one opening at a rim 114 thereof, that is suitable for holding material, e.g., soil 120 and a seed 150, in the soil container 110. In some embodiments, the soil container 110 may have a wider perimeter at the rim 114 thereof than a perimeter at a base 112 thereof. Advantageously, such an arrangement would allow the soil container 110, or the base 112 thereof, to be partially placed (e.g., fitted) into a further container, such as into a liquid container 130.

[0040] In some embodiments, the soil container 110 may be in the form of an open cylinder, having a circular base 112 at a bottom portion and a circular rim 114 at a top portion of the soil container 110. The circular rim 114 of the soil container 110 may have a different size than the circular base 112. For example, the circular rim 114 of the soil container 110 may be larger than the circular base 112. In other words, a surrounding wall portion of the soil container 110 may be tapered towards the base 112 of the soil container 110. Advantageously, as mentioned for other shapes, such an arrangement would allow the soil container 110, or the base 112 thereof, to be partially placed (e.g., fitted) into a further container, such as into a liquid container 130.

[0041] The soil container 110 may have a height 110a, wherein the soil container height 110a may be measured as a length from the base 112 to the rim 114 of the soil container 110.

The soil container 110 may be filled with soil 120 to a level 120a. The level to which the soil container 110 may be filled with soil 120 (i.e., the level 120a) may not exceed about 75%, or 50%, or 25%, or 10%, or 5% of the container height 110a. In other words, the soil 120 that is filled into the soil container 110 may only come up to about 75%, or 50%, or 25%, or 10%, or 5% of the length from the base 112 to the rim 114 of the soil container 110. Additionally, the soil container 110, at least above the level 120a, may be non-opaque. In some embodiments, the soil container 110 may additionally be windproof. The significance of this level 120a in combination with the non-opaque soil container 110 may be described as follows: During the growth stage of the seed 150, a stalk develops from the germinated seed, which may be thin and fragile. By disposing the seed 150 at a level 120a, that does not exceed 75%, or 50%, or 25%, or 10%, or 5% of the length from the base 112 to the rim 114 of the soil container 110, the thin and fragile stalk that developed from the seed 150 may be shielded from the environment, for example, from wind, which would otherwise cause damage to the thin and fragile stalk. At the same time, a non-opaque top portion of the soil container 110 may still ensure that the developing seed receives a sufficient amount of sunlight. If the soil container 110 would not be non-opaque, at least above the level 120a, the developing seed could only receive sufficient sunlight, if it was placed at a higher soil level than the level indicated herein, since the sunlight would otherwise not reach the developing seed. However, as discussed before, at a higher level, the developing seed would not be shielded from the environment, for example, from the wind. Accordingly and advantageously, by using a combination of a level 120a not exceeding 75%, or 50%, or 25%, or 10%, or 5% of the container height 110a and a soil container 110, that is, at least above the level 120a, non-opaque, the seed 150, after germination, may be protected from harsh weather conditions (such as wind or strong rain), while at the same time receiving a sufficient amount of sunlight. The combination of these features thus provides a beneficial environment for the seed 150 to develop into a mature plant, contributing to the advantage that is associated with the omission of a transplanting step. Moreover, this combination also obviates the use of an electric light source, which would deplete energy resources.

[0042] In some embodiments, the level 120a to which the soil container 110 may be filled with soil 120 may be lower than 75% of the container height 110a, for example, the level 120a may not exceed about 65%, or 55%, or 45%, or 35%, or 25%, or 15%, or 5% of the container height 110a. In some embodiments, the level 120a to which the soil container 110 may be filled with soil 120 may be in the range of about 25% to about 75%, or about 35% to 65%, or about

45% to 55%. In some embodiments, the level 120a to which the soil container 110 may be filled with soil 120 may be lower than 10%, such as in the range of about 1% to about 9%, or about 3% to about 7%, or about 5%. Advantageously, the benefits of a low soil level may be most effective at such a low soil level such as those below 10%.

[0043] In some embodiments, the soil container 110, at least above the level 120a, may be substantially non-opaque. For example, the soil container 110 may be at least 80% non-opaque, or at least 90% non-opaque, or at least 95% non-opaque. In some cases, the soil container 110 may be substantially transparent, and/or translucent. The term “at least above the level 120a”, as referred to herein, means the top portion of the soil container 110, that is not filled with soil 120. In other words, it may be defined by the height 110a of the soil container 110 and subtracting the length of the level 120a (or the height of the soil 120). In addition to the top portion of the soil container 110, that is not filled with soil 120, a material of the soil container 110 may also be substantially non-opaque (or substantially transparent) at the remaining parts of the soil container 110, i.e., any parts up to the level 120a. In other words, the soil container 110 may be entirely non-opaque (or substantially transparent).

[0044] In addition, the soil container 110 may be windproof. The term “windproof”, as referred to herein, indicates that the soil container 110 may provide sufficient stability to keep wind away from causing damage to the developing seed, in particular, damage to the thin and fragile stalk. The soil container 110, at the top portion above the level 120a, may thus comprise a material that is continuous (i.e., not perforated or otherwise permeable to wind).

[0045] The soil container 110 may be combined with a self-watering mechanism. Such a self-watering mechanism may be any mechanism that is capable of automatically providing an aqueous liquid to the topsoil level of the soil container. This provision of aqueous liquid may be continuous or periodically reoccurring. For example, a continuous self-watering mechanism may include the provision of a wicking string or of a drip valve. In both of these embodiments, the aqueous liquid may be provided from a liquid container. A periodically reoccurring self-watering mechanism may include the provision of a spray valve, that is connected to an aqueous liquid valve. In contrast to conventional systems and advantageously, the self-watering mechanism as described herein alleviates common difficulties associated with too much or too little watering, which may often cause pre-mature death of the developing seed. By ensuring that an aqueous liquid is automatically provided to the topsoil layer of the soil, this further enhances the germination of the seed, allowing for the omission of the transplanting step, resulting in the advantages as discussed hereinbefore.

[0046] Accordingly, the system 100 may further include a liquid container 130. The liquid container 130 may be any container, or body, which is suitable for holding an aqueous liquid 142. While the liquid container 130 is exemplary shown in FIG. 1 in the shape of an open cylinder, the liquid container 130 may be in any shape selected from the group consisting of an open cylinder, open cube, open sphere, open pyramid, and an open prism. Each of these shapes may have at least one opening at a top portion thereof, that is suitable for placing the aqueous liquid 142 inside the liquid container 130 (e.g., for holding the aqueous liquid 142). Additionally, the opening has the function of accommodating a wicking string 140 therethrough, for fluid connection to a topsoil layer of the soil 120 contained in the soil container 110. In some embodiments, the liquid container 130 may have a narrower perimeter at the top portion thereof than the perimeter at the base 112 of the soil container 110. Advantageously, such an arrangement would allow the soil container 110, or the base 112 thereof, to be partially placed into (e.g., fitted into) the liquid container 130.

[0047] In one embodiment, the soil container 110 and the liquid container 130 may form together one integral container, for example, one integral container with an upper compartment being the soil container 110 and a lower compartment being the liquid container 130. In other words, the base 112 of the soil container 110 may separate the soil container 110 from the liquid container 130.

[0048] The system 100 may further include the wicking string 140. The wicking string 140, as referred to herein, may be a water-absorbing or water-retaining cord or strip that transports the aqueous liquid 142 from the base 132 of the liquid container 130 to a topsoil layer of the soil container 110 through capillary action. Accordingly, the wicking string 140 may fluidly connect the aqueous liquid 142 in the liquid container 130 to the topsoil layer of the soil 120 in the soil container 110, or the wicking string 140 may fluidly connect the aqueous liquid 142 in the liquid container 130 to a position of where the seed 150 is configured to be sown. The topsoil layer of the soil container 110 may refer to the upper 10%, or the upper 5% of the soil 120 downwards from the level 120a. Conversely, a bottom soil layer may refer to the remaining part of the soil, i.e. the lower 90%, or the lower 95% of the soil 120 upwards from the base 112 of the soil container 110.

[0049] By providing a wicking string 140 that fluidly connects the aqueous liquid 142, that is placed in the liquid container 130, with the topsoil layer of the soil container 110, a self-watering system is provided that enables a constant supply of aqueous liquid 142 (optionally including liquid fertilizer) to the developing seed based on capillary action. This is different

from conventional self-watering systems, which would typically not employ wicking strings that reach a topsoil layer of the soil. In conventional systems, this would also not be deemed to be necessary, since conventional systems would not start with a seed, but with a germinated seed, that has already leaves on it. In contrast to conventional systems and advantageously, the self-watering system as described herein alleviates common difficulties associated with too much or too little watering, which may often cause pre-mature death of the developing seed. By ensuring that the wicking string 140 is in contact with the topsoil layer of the soil 120 (e.g., the wicking string reaches the level 120a), this further enhances the germination of the seed 150, allowing for the omission of the transplanting step, resulting in the advantages as discussed hereinbefore.

[0050] In some embodiments, the wicking string 140 may, at a first end thereof, be in contact with the topsoil layer inside the soil container 110. The segment of the wicking string 140 that is placed inside the soil container 110 may have a length, measured from the base 112 of the soil container 110 to the first end of the wicking string 140, that is equal to or longer than 5% of a height 110a of the soil container 110. For example, the segment of the wicking string 140 inside the soil container 110 may have a length between 5% to 80% of the height of the soil container 110, or between 10% to 70% of the height of the soil container 110, or between 20% to 60% of the height of the soil container. The wicking string 140 may, at a second end thereof, be inside the liquid container 130 and in contact with the aqueous liquid 142. In some embodiments, the wicking string 140 (e.g. the first end thereof) may be protruding from the level 120a, e.g., extending beyond the topsoil layer of the soil inside the soil container 110.

[0051] The wicking string 140 may include, or be made from, a material that is water-absorbing or water-retaining and may include a nylon rope, a cotton rope, a wool-pressed felt rope. Accordingly, the material may be selected from the group consisting of nylon, cotton, felt (e.g., wool-pressed felt), and combinations thereof. The nature and material of the wicking string 140 may be chosen according to the plant type, size of the soil container 110 and the environment (e.g., the climate).

[0052] According to some embodiments, the system 100 may further include the seed 150. The seed 150 may either be provided separately, for the individual to sow, or it may be placed (e.g., pre-sown) on or just below a top surface of the soil 120. The top surface of the soil 120 may refer to the upper surface of the topsoil layer, or, in other words, the part of the soil that marks the level 120a.

[0053] In some embodiments, a soil mixture of the topsoil layer may differ from a soil mixture of the bottom soil layer. For example, in some embodiments, the soil mixture of the topsoil layer may have a lower density than the soil mixture of the bottom soil layer. Advantageously, this lower density would further facilitate the growth of the seed into the seedling, and subsequently the mature plant, since germination of the seed may be easier in the soil mixture with lower density. For example, in some embodiments, the seed 150 may be covered with a thin layer of peat moss, which advantageously has a lower density than plant growing soil. A “thin layer” may be understood as a layer, which has a thickness that is about less than 5%, or less than 3%, or less than 1% of the container height 110a. Advantageously, such a thin layer of peat moss would provide protection from direct sunlight for the seed 150, while at the same being sufficiently light for the seed 150 to grow up and pass through it. Additionally, the peat moss may aid in keeping the topsoil layer and the seed 150 moisturized. Moreover, the peat moss may protect the seeds from animals (e.g., birds).

[0054] The seed 150 may be selected from various species, particularly those that grow into edible mature plants. For example, the seed 150 may include a seed for shallow root plants. Shallow root plants may include vegetables, selected from the group consisting of broccoli, kale, spinach, lettuce, and radishes. Additionally, shallow root plants may include flowering plants, selected from the group consisting of azaleas, hostas, salvias, hydrangeas, or petunias. The seed 150 may also include a seed for leafy vegetables, selected from the group consisting of Chinese spinach, Kang kong, Chinese cabbage/bok choy, Chinese flowering cabbage/cai xin, Chinese kale/kai lan, bayam, Kale, and lettuce. The seed 150 may also include a seed for fruited vegetables, selected from the group consisting of Lady's finger, Cucumber, Brinjal, Long Bean, chilli, and tomato. The seed 150 may also include a seed for herbs, selected from the group consisting of basil, mint and coriander.

[0055] The soil 120 may include plant growing soil, that is optionally enriched with a solid fertilizer. The plant growing soil may form the bottom soil layer. Particularly, the solid fertilizer may include non-water soluble nutrients. For example, the solid fertilizer may include calcium nitrate. The solid fertilizer may be added in intervals to the growth process, if necessary.

[0056] The aqueous liquid 142 may include water, optionally rain water. In some embodiments, the aqueous liquid 142 may additionally include a liquid fertilizer. Advantageously, when providing a liquid fertilizer in the aqueous liquid 142 to the developing seed in the form of a wicking string 140, a constant supply of nutrients is provided to the developing seed, to ensure growth into the mature plant.

[0057] According to some embodiments, the wicking string 140 may extend from the aqueous liquid 142 to the base 112 of the soil container 110. Accordingly, the wicking string 140 may extend through the base 112 of the soil container 110 to the soil 120, and through the soil 120 from the base 112 of the soil container 110 to reach the topsoil layer of the soil 120 or to reach a position where the seed 150 is configured to be placed. This may be enabled by the soil container 110 having a hole 116 in the base 112 of the soil container 110. As mentioned, the function of this hole 116 may be to allow for the wicking string 140 to pass from the liquid container 130 through the hole 116 to the topsoil layer of the soil container 110. This arrangement may be particularly advantageous in combination with the soil container 110 being partially placed into (e.g., fitted into) liquid container 130, since it enables the wicking string 140 to draw up the aqueous liquid 142 from the liquid container 130 and deliver it directly to the topsoil layer of the soil container 110, thereby reducing the length of the pathway that the aqueous liquid 142 has to be drawn up.

[0058] According to some embodiments, the wicking string 140 may be in contact with a base 132 of the liquid container 130. By enabling that the wicking string 140 touches the base 132 of the liquid container 130, the aqueous liquid 142 can be drawn up by capillary force until all of the aqueous liquid 142 in the liquid container 130 is depleted, therefore avoiding a situation wherein not sufficient aqueous liquid 142 is drawn up to the developing seed for reason of the wicking string 140 not reaching the aqueous liquid 142.

[0059] In some embodiments, the soil container 110 may be stacked above the liquid container 130, which may have the advantage that the amount of horizontal space that is consumed by the system 100 may be reduced.

[0060] According to some embodiments, as illustrated in FIG. 2, the soil container 210 may be placed partially into (e.g., fitted into) the liquid container 230. For example, a surrounding wall portion 215 of the soil container 210 may be tapered towards the base 212 of the soil container 210, and the soil container 210 may be stacked above the liquid container 230 such that the base 212 of the soil container 210 is fitted into the opening of the liquid container 230 so that the surrounding wall portion 215 of the soil container 210 abuts a rim of the opening of the liquid container 230. In other words, in this arrangement, the soil container 210 is partially immersed into liquid container 230. In these embodiments, the soil container 210 may be fitted into the liquid container 230, such that the level 220a of the soil container 210 is still exposed to sunlight. Accordingly, the soil container 210 should not be so immersed into the liquid container 230, that the topsoil layer, including the level 220a is obscured by the liquid container

230. This arrangement has the advantage, in that it is very space-economical, with space being a crucial resource in an urban environment. Moreover, advantageously, in this arrangement, a hole 216 in the bottom surface 212 of the soil container 210 could directly connect with the aqueous liquid 242 that is present in the liquid container 230, thereby reducing the length of the wicking string 240 that is required for the capillary action to take effect. While not explicitly shown, it is understood, that the remaining structural features present in FIG. 1 may optionally also be present in FIG. 2, but are omitted for clarity.

[0061] According to some embodiments, as illustrated in FIG. 3, the soil container 310 may include at least one ventilation hole 318. The at least one ventilation hole 318 may be placed at the surrounding wall portion that covers the bottom soil layer, e.g., the at least one ventilation hole 318 may be disposed at the soil container 310 that is below the level 320a. Advantageously, by employing a soil container 310 having at least one ventilation hole 318, the roots of the growing plant have better air flow, which prevents the roots from being too moist. While not explicitly shown, it is understood, that the remaining structural features present in FIG. 1 may optionally also be present in FIG. 3, but are omitted for clarity.

[0062] According to some embodiments, as illustrated in FIG. 4, the soil container 410 may further include a net lining 424 placed between the base 412 of the soil container 410 and the soil 420. In other words, the net lining 424 may be in contact with the base 412 of the soil container 410 and below the soil 420. The net lining 424 may optionally be a hydroponic net lining. Additionally, the net lining 424 may have a cavity for the wicking string 440 to pass through from the liquid container 430, but may otherwise be impermeable for the soil 420. Advantageously, by employing a net lining 424, the wicking string 440 may still pass through to enable a fluid connection for the self-watering system, while retaining the soil 420 in the soil container 410 as an “inner lining”. While not explicitly shown, it is understood, that the remaining structural features present in FIG. 1 may optionally also be present in FIG. 4, but are omitted for clarity.

[0063] According to some embodiments, as illustrated in FIG. 5, a plurality of soil containers 510, 510' may be stacked on top of one liquid container 530. A plurality of wicking strings 540, 540' may be in fluid connection with the aqueous liquid 542. This embodiment may have the advantage that several different seeds 550, 550' may be grown simultaneously, while reducing the number of liquid containers that are needed for the self-watering system. In other words, a plurality of wicking strings 540, 540' and a plurality of soil containers 510, 510' may be provided, wherein each wicking string fluidly connects the aqueous liquid 542 in

only one liquid container 530 to a topsoil layer of each soil container 510, 510' to support growing of a plurality of plants from seed to maturity. While not explicitly shown, it is understood, that the remaining structural features present in FIG. 1 may optionally also be present in FIG. 5, but are omitted for clarity.

[0064] In another aspect, there is provided a method 600 for growing a plant from seed to maturity with the system 100, 200, 300, 400 or 500 as described hereinbefore. The method 600 may include filling the soil container with the soil to the level not more than 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container. The method 600 may include placing the seed on or in the topsoil layer of the soil container. The method 600 may include filling the liquid container with the aqueous liquid. The method 600 may include disposing the wicking string to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container. The method 600 may include germinating the seed in the soil container. The method 600 may include growing the plant to maturity in the soil container without transplanting. Advantageously, the method 600 provides a modified plant growing method, wherein no transplanting is required for the entire growth stage of the seed into the mature plant. This advantage eliminates problems such as low germination success rates and/or a high amount of labor, time or electricity consumed during the plant growing process.

[0065] In some embodiments, the method 600 may further include covering the seed after it is placed into the soil container with peat moss. The seed may further be moisturized, optionally by using a sprayer, after it is placed into the soil container. Additionally, the method 600 may include adding solid fertilizer to the soil, which may be carried out at regular intervals (e.g., once a week). Additionally, the method 600 may include replenishing the aqueous liquid in the liquid container, which may involve the addition of liquid fertilizer. The system may further include topping up the soil, e.g., once the seed has grown into a young plant (e.g., one that contains a thin stalk and one or more leaves). Advantageously, by topping up the soil, the young plant would be able to obtain more nutrients from the soil. FIG. 6 shows a simplified flow diagram for an exemplary method 600 according to an aspect of the present disclosure.

[0066] The operation 602 may be directed to filling the soil container with the soil to the level not more than 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container.

[0067] The operation 604 may be directed to placing the seed on or in the topsoil layer of the soil container.

[0068] The operation 606 may be directed to filling the liquid container with the aqueous liquid.

[0069] The operation 608 may be directed to disposing the wicking string to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container.

[0070] The operation 610 may be directed to germinating the seed in the soil container.

[0071] The operation 612 may be directed to growing the plant to maturity in the soil container without transplanting.

[0072] Aspects and advantages described for systems 100, 200, 300, 400 and 500 can be analogously valid for the method 600, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[0073] In another aspect, there is provided a plant growing unit 700 for growing a plant from seed to maturity. The plant growing unit 700 may include a soil container 710 defining an interior space for holding soil. The plant growing unit 700 may include a liquid container 730 defining an interior space for holding liquid. The plant growing unit 700 may include a wicking string 740 extending from within the interior space of the liquid container 730 through a base 712 of the soil container 710 into the interior space of the soil container 710. A segment 742 of the wicking string 740 that is inside the soil container 710 may have a length, measured from the base 712 of the soil container 710 to a first end 744 of the wicking string 740 inside the soil container 710, that is equal to or longer than 5% of a height 710a of the soil container 710. At least an upper portion of the soil container 710 may be non-opaque, the upper portion being extending from a rim 714 of the soil container 710 to 75%, or 50%, or 25%, or 10%, or 5% or lower of the height 710a of the soil container 710 (e.g., from the rim 714 to a level 720a, up to which soil is configured to be filled). A second end 746 of the wicking string 740 inside the liquid container 730 is in contact with a base 732 of the liquid container 730. The soil container 710, the liquid container 730, the wicking string 740, and the height 710a of the soil container 710 may optionally include all features described in connection with the system 100, 200, 300, 400 and 500.

[0074] In some embodiments, the segment 742 of the wicking string 740 inside the soil container 710 may be between 5% to 80% of the height 710a of the soil container 710, or between 10% to 70% of the height 710a of the soil container 710, or between 20% to 60% of the height 710a of the soil container 710.

[0075] In some embodiments, the soil container 710, at least above the level 720a, may be substantially non-opaque. For example, the soil container 710 may be at least 80% non-opaque, or at least 90% non-opaque, or at least 95% non-opaque. In some cases, the soil container 710 may be substantially transparent, and/or translucent. The term “at least above the level 720a”,

as referred to herein, means a top portion of the soil container 710, that is not meant to be filled with soil 720 (or the upper portion of the soil container 710). In other words, it may be defined by the height 710a of the soil container 710 and subtracting the length of the level 720a. In addition to the top portion of the soil container 710, that is not filled with soil 720, a material of the soil container 710 may also be substantially non-opaque (or substantially transparent) at the remaining parts of the soil container 710, i.e., any parts up to the level 720a. In other words, the soil container 710 may be entirely non-opaque (or substantially transparent).

[0076] In some embodiments, the soil container 710 may be stacked above the liquid container 730, which may have the advantage that the amount of horizontal space that is consumed by the plant growing unit 700 may be reduced. In some embodiments, and in analogy to FIG. 5, several soil containers may be stacked on top of one liquid container, which may have the advantage that several plants may be grown simultaneously, while reducing the number of liquid containers that are needed for the self-watering system. In other words, a plurality of wicking strings and a plurality of soil containers may be provided, wherein each wicking string is configured to fluidly connect a liquid in only one liquid container to a topsoil layer of each soil container to support growing of a plurality of plants from seed to maturity.

[0077] According to some embodiments, and in analogy to FIG. 2, the soil container may be placed partially into (e.g., fitted into) the liquid container. For example, a surrounding wall portion of the soil container may be tapered towards the base of the soil container, and the soil container may be stacked above the liquid container such that the base of the soil container is fitted into the opening of the liquid container so that a surrounding wall portion of the soil container abuts a rim of the opening of the liquid container. In other words, in this arrangement, the soil container is partially immersed into the liquid container. In this embodiment, the soil container may be fitted into the liquid container, such that the level of the soil container is still exposed to sunlight. Accordingly, the soil container should not be so immersed into the liquid container, that the level is obscured by the liquid container. This arrangement has the advantage, in that it is very space-economical, with space being a crucial resource in an urban environment.

[0078] According to some embodiments, and in analogy to FIG. 3, the soil container may further include a ventilation hole.

[0079] According to some embodiments, and in analogy to FIG. 4, the soil container may further include a net lining placed inside the soil container on the base of the soil container.

[0080] According to some embodiments, the soil container may further include at least one visual marking for indicating 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container.

[0081] According to some embodiments, the soil container may be filled with soil to a level not more than 75%, or 50%, or 25%, or 10%, or 5% of a height of the soil container. Optionally, a seed may be placed on or just below a top surface of the soil in the soil container.

[0082] Aspects and advantages described for systems 100, 200, 300, 400 and 500 as well as the method 600 can be analogously valid for the plant growing unit 700, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[0083] As mentioned before, there is also disclosed the soil container described for systems 100, 200, 300, 400 and 500 in combination with other self-watering mechanisms. Accordingly, in another aspect, and as illustrated in FIG. 8, there is provided a system 800 for growing a plant from seed to maturity. The system may include a soil container 810 as described for systems 100, 200, 300, 400 and 500. The system 800 may include a liquid container 830 containing an aqueous liquid 842. In contrast to the liquid containers as described for systems 100, 200, 300, 400 and 500, the liquid container 830 of the system 800 may be arranged on top of the soil container 810. The system 800 may further include a tube 860 with a drip valve 862 capable of fluidly connecting the aqueous liquid 842 in the liquid container 830 to a topsoil layer of the soil 820 in the soil container 810. The soil container 810, the liquid container 830 and the tube 860 with the drip valve 862 together support growing of the plant from seed 850 to maturity without transplanting, whereby the plant grows from a seed 850 to a seedling and from the seedling to a mature plant in the soil container 810. The self-watering mechanism described in this embodiment uses gravity, which together with the drip valve 862 provides a continuous supply of aqueous liquid 842 to the topsoil layer of the soil 820 in the soil container 810. Advantageously, by using this self-watering mechanism, the replacement of the wicking string used in systems 100, 200, 300, 400 and 500 may be obviated, thus facilitating maintenance for the user.

[0084] According to some embodiments, the tube 860 may have a length dimensioned for connecting the liquid container 830 to a topsoil layer of the soil 820 in the soil container 810. Moreover, the tube 860 may have an inner diameter suitable for allowing for an aqueous liquid to pass through. A first end 866 of the tube 860 may be connected to the topsoil layer of the

soil 820, while a second end 864 of the tube 860 may be connected to the liquid container 830. A material of the tube may include a polymer.

[0085] In some embodiments, the tube 860 may, at its first end 866, include a dripper stick (e.g., a drip emitter stake) **connected to the tube 860 at the tube's first end 866. The dripper stick** may be designed for contacting the tube 860 to the topsoil layer. The dripper stick may catch a drop **that is emitted from the tube's first end 866** and the drop may flow at the outer surface of the dripper stick into the soil 820. Advantageously, by providing a dripper stick designed for the contact with the soil 820, clogging of the **tube's first end 866** with soil 820 may be avoided.

[0086] According to some embodiments, the liquid container 830 may have an opening at the base 832 of the liquid container 830, at which the second end 864 of the tube 860 is connected. Thus, the aqueous liquid 842 in the liquid container 830 may pass (or flow) through the action of gravity, from the liquid container 830 into the tube 860 via the second end 864 of the tube 860.

[0087] According to some embodiments, the drip valve 862 may be positioned along the length of the tube 860, and configured to allow a pre-determined amount of aqueous liquid 842 to pass through. The pre-determined amount may be set by the user and may be dependent on **the plant's needs**. For example, the drip valve 862 may allow between 1 mL/h and 300 mL/h of aqueous liquid 842 to pass through, wherein the actual amount can be manually adjusted, if needed.

[0088] While not explicitly shown, it is understood, that the remaining structural features present and defined in FIGS. 1-5 in relation with the soil containers 110, 210, 310, 410, 510 (such as the height of the soil container 810a, the base of the soil container 812 and the level of the soil 820a) may optionally also be present in FIG. 8, but are omitted for brevity. Moreover, aspects and advantages described for systems 100, 200, 300, 400 and 500 can be analogously valid for the system 800, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[0089] In another aspect, there is provided a method 900 for growing a plant from seed to maturity with the system 800 as described hereinbefore. The method 900 may include filling the soil container with the soil to the level not more than 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container. The method 900 may include placing the seed on or in the topsoil layer of the soil container. The method 900 may include filling the liquid container with the aqueous liquid. The method 900 may include disposing the tube with the drip valve to

fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container. The method 900 may include germinating the seed in the soil container. The method 900 may include growing the plant to maturity in the soil container without transplanting. Advantageously, the method 900 provides a modified plant growing method, wherein no transplanting is required for the entire growth stage of the seed into the mature plant. This advantage eliminates problems such as low germination success rates and/or a high amount of labor, time or electricity consumed during the plant growing process.

[0090] In some embodiments, the method 900 may further include covering the seed after it is placed into the soil container with peat moss. The seed may further be moisturized, optionally by using a sprayer, after it is placed into the soil container. Additionally, the method 900 may include adding solid fertilizer to the soil, which may be carried out at regular intervals (e.g., once a week). Additionally, the method 900 may include replenishing the aqueous liquid in the liquid container, which may involve the addition of liquid fertilizer. The system may further include topping up the soil, e.g., once the seed has grown into a young plant (e.g., one that contains a thin stalk and one or more leaves). Advantageously, by topping up the soil, the young plant would be able to obtain more nutrients from the soil. FIG. 9 shows a simplified flow diagram for an exemplary method 900 according to an aspect of the present disclosure.

[0091] The operation 902 may be directed to filling the soil container with the soil to the level not more than 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container.

[0092] The operation 904 may be directed to placing the seed on or in the topsoil layer of the soil container.

[0093] The operation 906 may be directed to filling the liquid container with the aqueous liquid.

[0094] The operation 908 may be directed to disposing the tube with the drip valve to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container.

[0095] The operation 910 may be directed to germinating the seed in the soil container.

[0096] The operation 912 may be directed to growing the plant to maturity in the soil container without transplanting.

[0097] Aspects and advantages described for the system 800 can be analogously valid for the method 900, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[0098] In another aspect, as illustrated in FIG. 10, there is provided a plant growing unit 1000 for growing a plant from seed to maturity. The plant growing unit 1000 may include a soil container 1010 defining an interior space for holding soil. The plant growing unit 1000 may include a liquid container 1030 defining an interior space for holding an aqueous liquid 1042. The plant growing unit 1000 may include a tube 1060 with a drip valve 1062 extending from the liquid container 1030 into the interior space of the soil container 1010. According to some embodiments, the liquid container 1030 may have an opening at the base 1032 of the liquid container 1030, at which the second end 1064 of the tube 1060 is connected. A segment of the tube 1060 inside the soil container 1010 has a length, measured from the rim 1014 of the soil container 1010 to a first end 1066 of the tube 1060 inside the soil container 1010 (positioned at a fill level 1020a of the soil), that is equal to or longer than 95% of a height 1010a of the soil container 1010. A second end 1064 of the tube 1060 is in contact with a base 1032 of the liquid container 1030. The soil container 1010 may optionally include all features described in connection with the systems 100, 200, 300, 400 and 500.

[0099] There is also disclosed the soil container described for systems 100, 200, 300, 400 and 500 in combination with yet another self-watering mechanism. Accordingly, in another aspect, and as illustrated in FIG. 11, there is provided a system 1100 for growing a plant from seed to maturity. The system 1100 may include a soil container 1110 as described for systems 100, 200, 300, 400, 500 and 800. The self-watering mechanism in this system is an automated periodically reoccurring self-watering mechanism.

[00100] The system 1100 may include a tube 1170. The tube 1170 may have a spray valve 1172 positioned along the length of the tube 1170 and configured to allow a pre-determined amount of aqueous liquid 1142 to pass through. The tube 1170 may further include a first end 1174 and a second end 1176. The first end 1174 of the tube 1170 may be capable of spraying the aqueous liquid 1142 to a topsoil layer of the soil 1120 in the soil container 1110. Accordingly, the first end 1174 of the tube 1170 may be facing the soil 1120. In other words, the tube 1170, and in particular the first end 1174, may project the aqueous liquid 1142 towards the topsoil layer of the soil 1120 in the soil container 1110. For example, the first end 1174 may have an outlet that allows for the dispersion of the aqueous liquid 1142. The second end 1176 of the tube 1170 may be connected to a source of the aqueous liquid 1142. A material of the tube 1170 may include a polymer.

[00101] According to some embodiments, the system 1100 may further include a liquid container. The second end 1176 of the tube 1170 may be connected to the liquid container, in

particular, to an opening of the liquid container. Thus, the aqueous liquid 1142 in the liquid container may pass (or flow), through the action of pressure, from the liquid container into the tube 1170 via the second end 1176 of the tube 1170. The liquid container may additionally include a pumping device and/or the liquid container may be under an overpressure, such that opening the spray valve 1172 may cause the aqueous liquid 1142 to be dispersed through the first end 1174 of the tube 1170 onto the topsoil layer. Advantageously, when the tube 1170 is connected to a liquid container, it is possible to add a liquid fertilizer to the aqueous liquid 1142, for example as described for the aqueous liquid in the first aspect.

[00102] In other embodiments, the second end 1176 of the tube 1170 may be connected to a water tap. Advantageously, when the tube 1170 is connected to a water tap, the user does not need to manually top up the aqueous liquid 1142, thereby saving on maintenance efforts for the user.

[00103] According to some embodiments, the system 1100 may further include a timer. The timer may be configured to allow for the aqueous liquid 1142 to pass through the tube 1170 and be sprayed on the topsoil layer about once or twice per day. The amount of the aqueous liquid 1142 may be pre-determined by the user setting a flow rate and a spray time, depending on the needs of the plant.

[00104] The soil container 1110 and the tube 1170 with the spray valve 1172 together support growing of the plant from seed 1120 to maturity without transplanting. Thus, the plant grows from a seed 1150 to a seedling and from the seedling to a mature plant in the soil container 1110.

[00105] While not explicitly shown, it is understood, that the remaining structural features present and defined in FIGS. 1-5 in relation with the soil containers 110, 210, 310, 410, 510 may optionally also be present in FIG. 11 (such as the height of the soil container 1110a, the level of the soil 1120a and the rim of the soil container 1114), but are omitted for brevity. Moreover, aspects and advantages described for systems 100, 200, 300, 400, 500 and 800 can be analogously valid for the system 1100, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[00106] In another aspect, there is provided a method 1200 for growing a plant from seed to maturity with the system 1100 as described hereinbefore. The method 1200 may include filling the soil container with the soil to the level not more than 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container. The method 1200 may include placing the seed on or in the topsoil layer of the soil container. The method 1200 may include disposing the tube with a

spray valve to spray the aqueous liquid from the first end to the topsoil layer of the soil in the soil container. The method 1200 may include germinating the seed in the soil container. The method 1200 may include growing the plant to maturity in the soil container without transplanting. Advantageously, the method 1200 provides a modified plant growing method, wherein no transplanting is required for the entire growth stage of the seed into the mature plant. This advantage eliminates problems such as low germination success rates and/or a high amount of labor, time or electricity consumed during the plant growing process.

[00107] In some embodiments, the method 1200 may further include covering the seed after it is placed into the soil container with peat moss. The seed may further be moisturized, optionally by using a sprayer, after it is placed into the soil container. Additionally, the method 1200 may include adding solid fertilizer to the soil, which may be carried out at regular intervals (e.g., once a week). Additionally, the method 1200 may include filling an aqueous liquid container with aqueous liquid and connecting the second end of the tube to the liquid container. The method 1200 may include replenishing the aqueous liquid in the liquid container, which may involve the addition of liquid fertilizer. Alternatively, the method 1200 may include connecting the second end of the tube to a water tap. The system may further include topping up the soil, e.g., once the seed has grown into a young plant (e.g., one that contains a thin stalk and one or more leaves). Advantageously, by topping up the soil, the young plant would be able to obtain more nutrients from the soil. FIG. 12 shows a simplified flow diagram for an exemplary method 1200 according to an aspect of the present disclosure.

[00108] The operation 1202 may be directed to filling the soil container with the soil to the level not more than 75%, or 50%, or 25%, or 10%, or 5% of the height of the soil container.

[00109] The operation 1204 may be directed to placing the seed on or in the topsoil layer of the soil container.

[00110] The operation 1206 may be directed to disposing the tube with the spray valve to spray the aqueous liquid from the first end to the topsoil layer of the soil in the soil container.

[00111] The operation 1208 may be directed to germinating the seed in the soil container.

[00112] The operation 1210 may be directed to growing the plant to maturity in the soil container without transplanting.

[00113] Aspects and advantages described for the system 1100 can be analogously valid for the method 1200, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[00114] In another aspect, there is provided a plant growing unit 1300 for growing a plant from seed to maturity. The plant growing unit 1300 may include a soil container 1310 defining an interior space for holding soil. The plant growing unit 1300 may include a tube 1370 with a spray valve 1372 and a first end 1374 and a second end 1376. The first end 1374 of the tube 1370 may be capable of spraying an aqueous liquid 1380 into the interior space of the soil container 1310. A second end 1376 of the tube 1370 is in contact with a source 1390 of an aqueous liquid 1390. The source 1390 may be optionally a liquid container defining an interior space for holding an aqueous liquid, or a connection to a water tap. It is understood, that the remaining structural features present and defined in FIGS. 1-5, 8, 10, 11 in relation with the soil containers 110, 210, 310, 410, 510, 810, 1010, 1100 may optionally also be present in FIG. 13 (such as the height of the soil container 1310a, the level of the soil 1320a and the rim of the soil container 1314), but are omitted for clarity. Moreover, aspects and advantages described for systems 100, 200, 300, 400, 500 and 800 can be analogously valid for the plant growing unit 1300, and vice versa. As the various aspects and advantages have already been described above, they shall not be iterated for brevity where possible.

[00115] The soil container 1310 may optionally include all features described in connection with the systems 100, 200, 300, 400, 500, 800 and 1100.

[00116] The term “comprising” shall be understood to have a broad meaning similar to the term “including” and will be understood to imply the inclusion of a stated integer or operation or group of integers or operations but not the exclusion of any other integer or operation or group of integers or operations. This definition also applies to variations on the term “comprising” such as “comprise” and “comprises”.

[00117] By “about” in relation to a given numerical value, such as for concentration and composition, it is meant to include numerical values within 10 % of the specified value.

[00118] Features that are described in the context of an embodiment may correspondingly be applicable to the same or similar features in the other embodiments. Features that are described in the context of an embodiment may correspondingly be applicable to the other embodiments, even if not explicitly described in these other embodiments. Furthermore, additions and/or combinations and/or alternatives as described for a feature in the context of an embodiment may correspondingly be applicable to the same or similar feature in the other embodiments.

[00119] In the context of various embodiments, the articles “a”, “an” and “the” as used with regard to a feature or element include a reference to one or more of the features or elements.

[00120] As used herein, the term “and/or” includes any and all combinations of one or more of the associated listed items.

EXAMPLES

[00121] The plant growth unit and the system is exemplified in the following, by describing the growth process of various seeds into the mature plant step-wise, accompanied by photographic illustrations.

[00122] Example 1

[00123] In a first step, a wicking string is placed on the bottom hole of a non-opaque soil container, while ensuring that the bottom of the wicking string touches the bottom of the outer liquid container (FIG. 14A). Subsequently, the non-opaque soil container is filled with suitable soil medium up to 75% (or not exceeding 75%) of a height of the soil container, depending on the types of plants that are intended to grow. It is ensured that the upper end of the wicking string touches the top part of the soil (FIG. 14B). Next, the seeds are placed on a required position on top of the soil medium (FIG. 14C). The seeds are covered with suitable germinating soil medium (for example peat moss), while ensuring the wicking string position so as to keep the germinating soil medium moist (FIG. 14D). The soil is now sprayed with water to wet the soil medium and the seeds (FIG. 14E). The liquid container is now filled with enough water. The bigger the water storage of the liquid container, the least efforts are needed to refill it. Next, liquid fertilizer is added to the water (FIG. 14F). The non-opaque soil container is now left in a suitable area for the plant to grow on its own. Water is refilled as needed and occasionally liquid fertilizer is added, depending on the water storage of the outer pot. Optionally, and if required, solid fertilizer can be added into the soil (FIG. 14G). If required, a suitable soil medium can be replenished and/or fertilizer in the soil container as and when needed depending on the vegetables grown.

[00124] Example 2

[00125] Growth Stage for Curly Wrap Wong King Pak Choy Vegetable

[00126] Starting the growth process as indicated in Example 1, after 2-3 days the seeds germinate (FIG. 15A). About 3 weeks later, the growth process already well progressed, the plant can already be harvested (FIG. 15B).

[00127] Example 3

[00128] Growth Stage for Bayam Vegetable (1)

[00129] Seeds for this species were sown on Day 1 (FIG. 16A). On Day 13, the plants were still in a growing stage (FIG. 16B). On Day 17, growth is further progressing (FIG. 16C), until reaching the edible stage of a mature plant on Day 30 (FIG. 16D).

[00130] **Example 4**

[00131] Growth Stage for Bayam Vegetable (2)

[00132] Seeds for this species were sown on Day 1 (FIG. 17A). On Day 3, the plants were still in a growing stage (FIG. 17B). On Day 20, growth is further progressing (FIG. 17C), until reaching the edible stage of a mature plant on Day 28 (FIG. 17D).

[00133] **Example 5**

[00134] Comparative Example of the soil level and pot size

[00135] A chilli seed was planted into a soil container according to embodiments of the present disclosure. The seeds were able to develop into a stalk with leaves (FIG. 18A) without the need for transplanting, leaving the space to top up the soil continuously to a level near to the rim, as the plant grows. Thus, it was possible to grow the seed into a seedling, and afterwards into a plant without the need for a transplanting step. Moreover, topping up the soil ensured that the plant, during growth stage, always received fresh nutrients, again without the tedious transplanting step.

[00136] A comparison with a chili plant grown in a traditional pot (FIG. 18B, traditional chili plant shown on the right) demonstrated that starting the seeds at a lower soil level in a translucent embodiment provides space for gradually topping up the soil to the rim, allowing the chili plant to grow into an adult plant in the same size embodiment as it would in a traditional pot, all without the need for transplanting.

[00137] **Example 6**

[00138] FIG. 19 shows that the plant growing system according to embodiments of the present disclosure also allows for a larger scale set-up. Hence, there are shown three vertically stacked racks of each one liquid container and a soil container on top of the liquid container at various growth stages of the plants. On the lowest rack there are disposed six pots of seeds to be grown into seedlings using one liquid container. On the middle rack there are disposed six pots of stalks with thin leaves using one liquid container. On the top rack there are disposed two pots of plants during growth stage using one liquid container. Accordingly, with the growth system according to various embodiments of the present disclosure, it is possible to grow a multitude of plants at the same time while consuming only a minimum of space and requiring only a minimum of maintenance.

[00139] While the present disclosure has been particularly shown and described with reference to specific aspects, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the present disclosure as defined by the appended claims. The scope of the present disclosure is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced.

CLAIMS

1. A system for growing a plant from seed to maturity, the system comprising:
 - a soil container containing soil, wherein the soil is filled to a level not more than 75% of a height of the soil container, wherein the soil container, at least above the level of the soil, is non-opaque;
 - a liquid container containing an aqueous liquid; and
 - a wicking string fluidly connecting the aqueous liquid in the liquid container to a topsoil layer of the soil in the soil container,

wherein the soil container, the liquid container and the wicking string together support growing of the plant from seed to maturity without transplanting, whereby the plant grows from a seed to a seedling and from the seedling to a mature plant in the soil container.
2. The system of claim 1, further comprising the seed.
3. The system of claim 2, wherein the seed is placed on or just below a top surface of the soil.
4. The system of any one of claims 1 to 3, wherein the soil comprises the topsoil layer and a bottom soil layer, wherein a soil mixture of the topsoil layer and a soil mixture of the bottom soil layer are different.
5. The system of claim 4, wherein the soil mixture of the topsoil layer has a lower density than a soil mixture of the bottom soil layer.

6. The system of claim 4 or claim 5, wherein the soil mixture of the topsoil layer comprises peat moss.
7. The system of any one of the preceding claims, wherein the soil comprises a solid fertilizer.
8. The system of any one of the preceding claims, wherein the aqueous liquid comprises a liquid fertilizer.
9. The system of any one of the preceding claims, wherein the wicking string extends from the aqueous liquid to a base of the soil container, through the base of the soil container to the soil, and through the soil from the base of the soil container to reach the topsoil layer of the soil or to reach a position where the seed is configured to be placed.
10. The system of any one of the preceding claims, wherein the wicking string is in contact with a base of the liquid container.
11. The system of any one of the preceding claims, wherein the soil container is stacked above the liquid container.
12. The system of any one of the preceding claims, wherein the soil container further comprises a ventilation hole.
13. The system of any one of the preceding claims, wherein the soil container further comprises a net lining placed between the base of the soil container and the soil.

14. The system of any one of the preceding claims, wherein the level of the soil is at least 25% and not exceeding 75% of the height of the soil container.

15. The system of any one of the preceding claims, wherein the wicking string comprises a material selected from the group consisting of nylon, cotton, felt, and combinations thereof.

16. The system of any one of the preceding claims, wherein the soil container is entirely non-opaque.

17. The system of any one of the preceding claims, further comprising a plurality of wicking strings and a plurality of soil containers, wherein each wicking string fluidly connects the aqueous liquid in the liquid container to a topsoil layer of each soil container to support growing of a plurality of plants from seed to maturity.

18. A method for growing a plant from seed to maturity with the system according to any one of claims 1 to 17, the method comprising the steps of:

- filling the soil container with the soil to the level not more than 75% of the height of the soil container;
- placing the seed on or in the topsoil layer of the soil container;
- filling the liquid container with the aqueous liquid;
- disposing the wicking string to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container;
- germinating the seed in the soil container; and
- growing the plant to maturity in the soil container without transplanting.

19. The method of claim 18, further comprising moisturizing the seed, after it is placed into the soil container, optionally by using a sprayer.

20. The method of any one of claims 18 or 19, further comprising adding solid fertilizer to the soil.

21. The method of any one of the preceding claims 18 to 20, further comprising replenishing the aqueous liquid in the liquid container.

22. The method of any one of the preceding claims 18 to 21, further comprising topping up the soil in the soil container.

23. A plant growing unit for growing a plant from seed to maturity, the plant growing unit comprising:

- a soil container defining an interior space for holding soil;
- a liquid container defining an interior space for holding liquid; and
- a wicking string extending from within the interior space of the liquid container through a base of the soil container into the interior space of the soil container,

- wherein a segment of the wicking string inside the soil container has a length, measured from the base of the soil container to a first end of the wicking string inside the soil container, that is equal to or longer than 25% of a height of the soil container,

- wherein at least an upper portion of the soil container is non-opaque, the upper portion being extending from a rim of the soil container to 75% or lower of the height of the soil container,

- wherein a second end of the wicking string inside the liquid container is in contact with a base of the liquid container.

24. The plant growing unit as claimed in claim 23, wherein the length of the segment of the wicking string inside the soil container is between 25% to 80% of the height of the soil

container, or between 50% to 80% of the height of the soil container, or between 70% to 80% of the height of the soil container.

25. The plant growing unit as claimed in claim 23 or 24, wherein the soil container is entirely non-opaque.

26. The plant growing unit as claimed in any one of claims 23 to 25, wherein the soil container is stacked above the liquid container.

27. The plant growing unit as claimed in claim 26, wherein a surrounding wall portion of the soil container is tapered towards the base of the soil container, wherein the soil container is stacked above the liquid container by fitting the base of the soil container into an opening of the liquid container such that the surrounding wall portion of the soil container abuts a rim of the opening of the liquid container.

28. The plant growing unit as claimed in any one of claims 23 to 27, wherein the soil container further comprises a ventilation hole.

29. The plant growing unit as claimed in any one of claims 23 to 28, wherein the soil container further comprises a net lining placed inside the soil container on the base of the soil container.

30. The plant growing unit as claimed in any one of claims 23 to 29, wherein the soil container comprises at least one visual marking for indicating 75% of the height of the soil container.

31. A system for growing a plant from seed to maturity, the system comprising:

a soil container containing soil, wherein the soil is filled to a level not more than 75% of a height of the soil container, wherein the soil container, at least above the level of the soil, is non-opaque;

a liquid container containing an aqueous liquid; and

a tube with a drip valve capable of fluidly connecting the aqueous liquid in the liquid container to a topsoil layer of the soil in the soil container,

wherein the soil container, the liquid container and the tube with the drip valve together support growing of the plant from seed to maturity without transplanting, whereby the plant grows from a seed to a seedling and from the seedling to a mature plant in the soil container.

32. A method for growing a plant from seed to maturity with the system according to claim 31, the method comprising the steps of:

- filling the soil container with the soil to the level not more than 75% of the height of the soil container;
- placing the seed on or in the topsoil layer of the soil container;
- filling the liquid container with the aqueous liquid;
- disposing the tube with the drip valve to fluidly connect the aqueous liquid in the liquid container with the topsoil layer of the soil in the soil container;
- germinating the seed in the soil container; and
- growing the plant to maturity in the soil container without transplanting.

33. A plant growing unit for growing a plant from seed to maturity, the plant growing unit comprising:

a soil container defining an interior space for holding soil;

a liquid container defining an interior space for holding liquid; and

a tube with a drip valve extending from the liquid container into the interior space of the soil container,

wherein a segment of the tube inside the soil container has a length, measured from the rim of the soil container to a first end of the tube inside the soil container, that is equal to or longer than 95% of a height of the soil container,

wherein at least an upper portion of the soil container is non-opaque, the upper portion being extending from a rim of the soil container to 5% or lower of the height of the soil container,

wherein a second end of the tube is in contact with a base of the liquid container.

34. A system for growing a plant from seed to maturity, the system comprising:

a soil container containing soil, wherein the soil is filled to a level not more than 75% of a height of the soil container, wherein the soil container, at least above the level of the soil, is non-opaque;

a tube with a spray valve and a first end and a second end, the first end of the tube capable of spraying an aqueous liquid to a topsoil layer of the soil in the soil container,

wherein the soil container and the tube with the spray valve together support growing of the plant from seed to maturity without transplanting, whereby the plant grows from a seed to a seedling and from the seedling to a mature plant in the soil container.

35. The system of claim 34, further comprising a liquid container containing the aqueous liquid and wherein the second end of the tube is connected to the liquid container.

36. The system of claim 34 or claim 35, wherein the spray valve is operated through a timer.

37. A method for growing a plant from seed to maturity with the system according to any of the preceding claims 34 to 36, the method comprising the steps of:

- filling the soil container with the soil to the level not more than 75% of the height of the soil container;
- placing the seed on or in the topsoil layer of the soil container;
- disposing the tube with the spray valve to spray the aqueous liquid from the first end to the topsoil layer of the soil in the soil container;
- germinating the seed in the soil container; and
- growing the plant to maturity in the soil container without transplanting.

38. A plant growing unit for growing a plant from seed to maturity, the plant growing unit comprising:

a soil container defining an interior space for holding soil;

a tube with a spray valve and a first end and a second end, the first end of the tube capable of spraying an aqueous liquid into the interior space of the soil container,

wherein at least an upper portion of the soil container is non-opaque, the upper portion being extending from a rim of the soil container to 5% or lower of the height of the soil container,

wherein a second end of the tube is in contact with a source of an aqueous liquid.