

Groasis Waterboxx Manual for Vegetables

1. Use a greenhouse according to the design as shown in the picture below, with the possibility to ventilate the sides and with a double screen/shade with white color on top and black color below, at minimally 100 cm above the plastic.



2. Use ventilation openings along the whole side. If you expect to have insect problems, add insect-screen in the ventilation openings on the side. However, in warm climates this will decrease ventilation capacity and your greenhouse may be too hot during the day.



3. Take a soil sample to determine pH, levels of salt, available nutrients, organic matter, etc.

4. Prepare the soil max 15 cm deep, making sure that you leave the capillary structure under this 10 cm intact. Then make planting holes. If you do not add compost or organic matter, make the planting hole 15 cm deep and add 20 liters of water in the planting hole on clay soil. Add 40 liters of water in the planting hole if you have sandy soil. Then wait for one day to allow the water to penetrate the soil. Start planting the next day.



5. Plant the vegetables the next day, max 15 cm deep. Be sure to leave the capillary system of the soil under the box intact.



6. If you put compost with organic nutrients and mycorrhizae under the box, then use old and

degraded compost. If it is too fresh, a too high salt level might cause the roots to burn. Do not use artificial fertilizer, as that might also contain too much salt.

7. Put 2 wicks in each box. One hole is already prepared, prepare 1 extra hole with the same distance to the middle opening as the original hole. Make both holes 4.8 mm diameter.



8. Grow plants with intact, vertically downwards growing tap roots. Use open plugs to achieve this.





9. Use only those varieties that are able to grow there and have enough tolerance to stand your local conditions. You may think of light intensity, day length, temperature and humidity tolerance.
10. With all vegetables, you plant two plants in each box. Carefully check the designs that you find on this web page <http://www.groasis.com/en/technology/grow-healthy-sustainable-organic-vegetables> .
11. Put the opening of the box in the length of the row. Before placing the box, do not forget to add the anti-evaporation cover underneath it, in order to prevent water loss through evaporation.
12. If you have climbers (cucumber, tomato) prune each plant in such a way that you get two sprouts on each plant (check design 3). Plant the boxes in rows. With climbers like cucumber and tomatoes plant each row with a heart to heart distance of 1.50 meters. *In* the row you put each box heart to heart at 1.6 meters distance (= one box per 2.4 m²).
13. With water melon, squash and pumpkin you use other planting distances. Plant each row with a heart to heart distance of 3 meters. *In* the row you put each box heart to heart at 3 meters distance too (= one box per 9 m²). Once the plants 'meet' each other and have covered the field, prune the growing tips. (check design 3)
14. Sweet melons are planted each row with a heart to heart distance of 2 meters. *In* the row you put each box heart to heart at 2 meters distance (= one box per 4 m²). Once the plants 'meet' each other and have covered the field, prune the growing tips. (check design 3)
15. With aubergine, peppers and paprika you plant each row with a heart to heart distance of 1.25 meters. *In* the row you put each box heart to heart at 0.75 meter distance (= one box per 1 m²). Prune each plant in such a way that you get 3 stems on each plant. (check design 3)
16. With courgette you plant each row with a heart to heart distance of 1.25 meters. *In* the row you put each box heart to heart at 1 meter distance (= one box per 1.25 m²). Support the plant later on with 2-3 bamboo sticks. (check design 4)
17. When planting, fill the box with 16 liters of water, and during filling *indirectly* spill an extra 4 liters into the opening in the middle. If you put the water directly into the opening, you might wash the roots out. Make sure that the water flow into the opening is gentle enough not to damage the little young plants.
18. Refill the boxes every 15 days.
19. While producing the plants in the plugs it is very important to pay attention to sprinkling with water. As the buffer in the plug is small, and as we want a 15 cm high plant, daily, possibly multiple sprinkler irrigation, is necessary. As so many sprinkler moments will be used,



minerals may be washed out, therefore the peat in the plugs must be mixed with sufficient nutrient additives.

20. Take care that the peat that you use to grow your plants is not only treated with sufficient nutrients, but also treated with the right nutrients and mycorrhizae, so that root growth and plant health is secured.
21. After planting, keep a close eye on the climate in the greenhouse. The optimum growth temperature is +23 to +27°C with an optimum humidity of 65%. If you have to choose between optimum temperature and optimum humidity, choose for temperature. If the temperature goes too high, leaves will burn. If the humidity goes too high, fungi will start to grow on your leaves.
22. Check regularly for fungus and insect infections and treat them in time. Use biological treatment methods of Koppert International <http://www.koppert.com> . Ask free assistance from your local supplier.
23. Use sufficient bees or bumblebees for pollination of your flowers. Better pollination can lead to 50% increase in crop production.
24. Every crop requires its own treatment and way of handling. If you are not experienced enough, it will be necessary to hire a specialist to teach you these things.
25. Make sure that you get enough assistance to be able to grow a healthy high productive crop to sell for good prices.
26. Follow the planting instructions that you find under the Manuals-link in the Groasis website www.groasis.com . Your plants must be big enough when they are planted. See to it that all plants have a height of minimum 15 cm and that they have undamaged vertically downwards growing tap roots. This means that the age of your plant material – if grown under the right conditions - will be between 25 to 45 days. Use the QR to get the planting instructions downloaded in your smart phone.

Manual planting
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