OASIS® RhizoPlug™ Sheet

OASIS® RhizoPlug™ Sheet growing media demonstrates superior performance compared to its preceding generation, OASIS® Rootcubes® growing media, with five culinary herbs propagated from vegetative cuttings.

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Introduction

OASIS® engineered growing media is renowned for the propagation of clean, uniform and consistent quality young plants. OASIS® RhizoPlug™ Sheet is a next-generation of engineered growing media developed specifically for precision propagation of vegetative cuttings. Using advanced plant-friendly chemistry, the density and strength were significantly decreased and capillarity was significantly improved for OASIS® RhizoPlug™ Sheet growing media compared to its preceding generation of growing media. OASIS® RhizoPlug™ Sheets are pre-dibbled with an improved universal star hole and available in 50, 104 and 162 count plug sheets.

Objective

The objective of the current study was to demonstrate the rooting and shoot growth performance of OASIS® RhizoPlug™ Sheet growing media compared to its preceding generation, OASIS® Rootcubes® growing media.

Materials & Methods

This experiment was conducted during the months of August and September 2023 at the OASIS® Grower Solutions Controlled Environment Agriculture (CEA) research facility in Kent, OH. Shoot tip cuttings of Lemon Balm, Rosemary 'Arp', Thyme 'French', Mint 'Mojito' and Sage 'Berggarten' were obtained from Darwin Colombia and Selecta Kenya. The cuttings were rooted either in 104 or 50 count OASIS® RhizoPlug™ Sheets and OASIS® Rootcubes® growing media.

Table 1 Physical properties of OASIS® Rootcubes® and OASIS® RhizoPlug™ Sheet

Properties	OASIS® Rootcubes®	OASIS® RhizoPlug ™ Sheet
pH	5.0–5.8	5.4–6.0
EC (mS/cm)	0.2–0.4	0.2–0.4
Total Porosity (%)	90–96	90–95
Air Porosity (%)	10–14	1–5
Water Holding Capacity (%)	80–86	90–94
Bulk Density (kg/m3)	18–22	12–16
Initial Moisture Content (%)	0	0

Experiment Details

Initial Watering

It must be noted that OASIS® RhizoPlug™ Sheets arrive completely dry without any initial moisture. Therefore, it is critical to thoroughly saturate the media prior to use to obtain the best performance. For this study, the sheets were watered using subirrigation followed by overhead watering to ensure there were no dry spots and pH and EC were equilibrated. First, sheets were placed in a standard 10x20 tray with drain holes followed by a solid bottom 10x20 tray. Next, sheets were watered overhead with 7.5 L nutrient solution to fully saturate the substrate. The sheets and tray with drain holes were then removed from the solid bottom tray and allowed to drain. The sheets were then watered overhead with 5 L nutrient solution.

Misting

Cuttings were rooted under intermittent mist using clear water with no nutrients. For the first 24 hours, cuttings were misted for 10 seconds every 6 minutes. After the first 24 hours, misting frequency gradually decreased and was only applied during daytime hours.

Watering & Nutrients

Nutrient solution was made with municipal water (EC 0.31 mS/cm, pH 7.46, and Alkalinity 49.56 mg/L) using Jack's Professional® 15-5-15 + Ca-Mg LX fertilizer at 150 ppm N. The pH of the nutrient solution was adjusted to 5.8. Cuttings received fertilizer with initial watering and, from day 7 onward, every 3 to 4 days. No plant growth regulators (PGRs) or plant protection chemicals were applied.

Greenhouse Conditions

The greenhouse heating and venting set points were adjusted to maintain 72°F (22°C) during daytime and 70°F (21°) during nighttime. A 14-hour day length was provided by supplementing natural light with LEDs (Phillips Lighting, Green Power LED production module 2.2 DR/W/FR150 LB HO NA). A minimum light intensity of 100 µmol/m2/s was maintained at the plant canopy level. When light levels exceeded 300 µmol/m2/s at the canopy level, the greenhouse was covered with shade curtains. The greenhouse relative humidity was maintained between 90% and 95%. Bottom heat was provided to maintain a temperature of 70°F in the root zone.

Observations

Root and shoot growth were evaluated on a qualitative scale of 0 to 5 (0 meaning no visible roots, and 5 meaning fully rooted). Data was collected across 3 replicates with 10 plugs per replication for 50 count sheets, and 13 plugs per replication for 104 count sheets. The data was subjected to ANOVA analysis using Statistica™ 13.5.0.17 software program (TIBCO Software Inc. 1984-2018) and presented in a graphical format.

Results

Rooting evaluation was conducted between 2 to 3 weeks after sticking, depending on the crop. In general, with every crop that was tested, we noted faster hydration and establishment of the cuttings in OASIS® RhizoPlug™ Sheet compared to OASIS® Rootcubes® growing media (visual observations, data not presented).

Regarding shoot and root growth, the performance was superior in OASIS® RhizoPlug™ Sheet compared to OASIS® Rootcubes® (Fig. 1 -5). The data is presented here using photos and graphs. The different letters in these graphs indicate significant differences ($P<0.05$) between treatments.

Fig 1A–C. Lemon Balm, day 15 after sticking in 104 count OASIS® Rootcubes® (L) and OASIS® RhizoPlug™ Sheet (R).
The photos in 1A are full sheets, 1B are representative plugs and 1C is a graphical presentation of data.

Fig. 1A

Fig. 1B

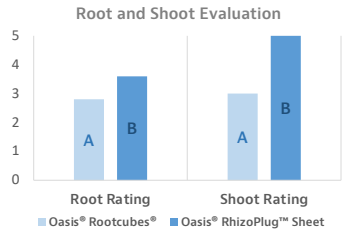

Fig. 1C

Fig 2A–C. Rosemary 'Arp', day 20 after sticking in 104 count OASIS® Rootcubes® (L) and OASIS® RhizoPlug™ Sheet (R).
The photos in 2A are full sheets, 2B are representative plugs and 2C is a graphical presentation of data.

Fig. 2A

Fig. 2B

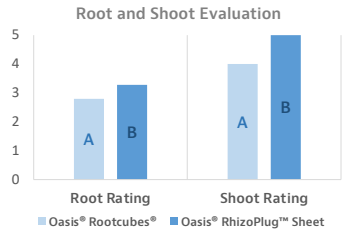

Fig. 2C

Fig 3A–C. Thyme 'French', day 22 after sticking in 104 count OASIS® Rootcubes® (L) and OASIS® RhizoPlug™ Sheet (R).
The photos in 3A are full sheets, 3B are representative plugs and 3C is a graphical presentation of data.

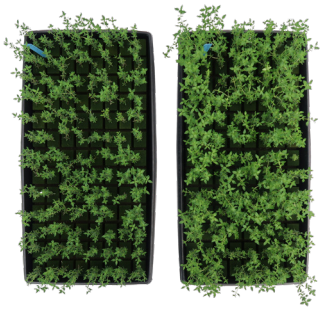

Fig. 3A

Fig. 3B

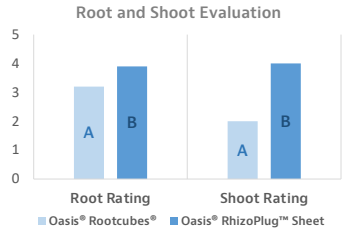

Fig. 3C

Fig 4A–C. Mint 'Mojito', day 10 after sticking in 104 count OASIS® Rootcubes® (L) and RhizoPlug™ OASIS® RhizoPlug™ Sheet (R).
The photos in 4A are full sheets, 4B are representative plugs and 4C is a graphical presentation of data.

Fig. 4A

Fig. 4B

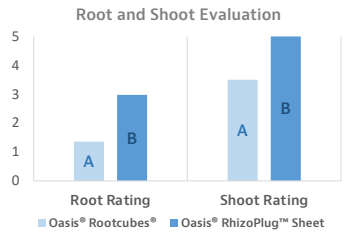

Fig. 4C

Fig 5A–C. Sage 'Berggarten', day 17 after sticking in 104 count OASIS® Rootcubes® (L) and OASIS® RhizoPlug™ Sheet (R).
The photos in 5A are full sheets, 5B are representative plugs and 5C is a graphical presentation of data.

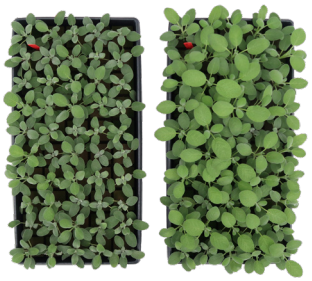

Fig. 5A

Fig. 5B

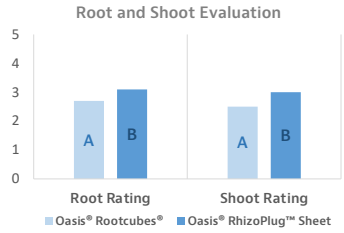

Fig. 5C

Discussion

The superior performance in OASIS® RhizoPlug™ Sheet compared to OASIS® Rootcubes® can be attributed to the following factors:

+ The advanced surfactant technology used in OASIS® RhizoPlug™ Sheet is promoting faster water uptake by the cuttings and helping with rapid establishment of cuttings.
+ Lower density and limited resistance of OASIS® RhizoPlug™ Sheet is facilitating easy sticking without any further damage to the cut end of the stem, encouraging vigorous root growth with fine root architecture.
+ Faster, improved cutting establishment and rooting in OASIS® RhizoPlug™ Sheet is resulting in superior ongoing root growth.
+ The redesigned universal star dibble used on OASIS® RhizoPlug™ Sheet is providing maximum contact with the cut end of thin or thick caliper cuttings.
+ Like OASIS® Rootcubes® Sheet growing media, OASIS® RhizoPlug™ Sheet growing media arrives clean and reduces pest and pathogen pressure because of its inert nature.

Conclusion

The OASIS® RhizoPlug™ Sheet growing media significantly improved the performance of the five culinary herbs propagated from vegetative cuttings for this experiment. Visual observations noted faster hydration and cutting establishment compared to the preceding generation of growing media, OASIS® Rootcubes®. Root and shoot evaluation and subsequent data analysis and ratings confirmed all five culinary herbs in the study demonstrated superior performance in OASIS® RhizoPlug Sheet compared to OASIS® Rootcubes®. In addition, the improved performance of the new generation OASIS® RhizoPlug™ growing media cut down bench time by 10 to 15%.

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