



# Standardization of Growing Media for Haworthia Pot Plant

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**Abstract:** Investigation was carried out to standardize growing media for *Haworthia attenuata*, a popular succulent pot plant at Navsari Agricultural University, Navsari. The experiment consisted of different growing media viz., M<sub>1</sub>- cocopeat + vermicompost + rice husk (6:1:3), M<sub>2</sub>-cocopeat + vermicompost + perlite (6:1:3), M<sub>3</sub>- cocopeat + vermicompost (9:1), M<sub>4</sub>-local black soil + vermicompost+sand (6:1:3), M<sub>5</sub>-cocopeat+ vermicompost+ charcoal (7:1:2), M<sub>6</sub>-sand+vermicompost (9:1) and M<sub>7</sub>- white grit+vermicompost (9:1) in 10x10 cm pot. The observations were recorded at every three months interval, and pooled data analysis of three years was done. Among different growing media, sand: vermicompost (9:1) was highly suitable with regard to plant height, plant spread and number of leaves. Further, number of suckers as well as root length and number of roots were observed maximum in sand: vermicompost (9:1) growing media. Thus, growing media comprising of sand: vermicompost (9:1) was highly suitable for growing *Haworthia* as pot culture to obtain better plant growth and quality.

**Keywords:** Succulent, *Haworthia*, Pot plant, Growing media, Sand, Cocopeat, Vermicompost

Pot plant trading is recently gaining the impetus of an industry with the growing demand of quality ornamental plants in domestic as well as international trade. Rapidly growing urbanization and population explosion with hasty life style have created space paucity for living, wherein pot plants offers some respite (Singh et al 2016, Guddad et al 2022, Sindhuja et al 2022). In critical times that prevailed during the epidemic COVID-19, indoor gardening helped to enhance sense of emotional comfort and created sense of stress free happy environment (Altman 2011, Singh et al 2020). Succulent plants are increasingly in demand as indoor pot plant for urban horticulture (Dewir 2016, Cabahug et al 2018) because of specific characteristics like drought resistance (Baldwin 2013, Edwards and Ogburn 2013) and low light tolerance (Bell 2001, Nefzaoui 2007). Drought-tolerant plants are increasingly recognized as a resource to mitigate the consequences of climate change and need to be preserved (Grace 2019). Besides, succulents are known to exhibit crassulacean acid metabolism (CAM), resulting in CO<sub>2</sub> assimilation during night time (Lee 2010, Herrera 2009) and thus contribute in improving indoor air quality.

*Haworthia* is a small succulent ornamental plant native to South Africa, belongs to family *Asphodelaceae* and is native to South Africa. The cultivation of *haworthia* as pot plant is increasing in different countries owing to its small compact growth habit and drought tolerance characteristic (El Shamy et al 2018, Grace 2019). Its popularity and demand is further increasing for offices and homes as it can flourish at low light levels also. The successful potting media should provide

good physical support for the plant, a reservoir for nutrients and water with sufficient drainage and aeration. Research on growing media standardization in succulents is meagre with no previous work on *haworthia*. Hence, research was conducted to standardize growing media for *haworthia* as pot plant.

## MATERIAL AND METHODS

The present study was carried out at Navsari Agricultural University, Navsari-396450, Gujarat during 2017-2020 on popular succulent indoor plant *Haworthia attenuata* in a protected structure clad with 200 micron UV stabilized film and 50 per cent shade net. The treatments consisted of seven growing media viz., M<sub>1</sub>- Cocopeat + vermicompost + Rice husk (6:1:3), M<sub>2</sub>- Cocopeat + vermicompost + perlite (6:1:3), M<sub>3</sub>- Cocopeat + vermicompost (9:1), M<sub>4</sub>- Local black soil+ vermicompost+ sand (6:1:3), M<sub>5</sub>- Cocopeat + vermicompost + Charcoal (7:1:2), M<sub>6</sub>-Sand+vermicompost (9:1) and M<sub>7</sub>- White grit+vermicompost (9:1) in 10x10 cm uv stabilised plastic pot. The experiment was laid out in completely randomized design with three repetitions for three consecutive years and each year new plantation was done. Uniform sized plants were planted in different growing media and uniform management practices were given for all treatments. As nutrient management, NPK (19:19:19) at 250 mg/l was given @ 50 ml per plant at monthly interval. Observations on different parameters like plant height, plant spread (E-W and NS), number of leaves and number of suckers were recorded at every three months of interval i.e.



i.e Sand: Vermicompost (9:1) after 3 (19.36), 6 (25.17), 9(33.62) and 12(41.62) months (Table 2). Better plant growth in terms of leaves and suckers was the result of better rooting system indicated with more number of roots and longer root being developed in sand: vermicompost media (9:1). An appropriate growing media provides better rooting system contributes in more water and nutrients for successful growth and development of the plants (Wazir et al 2004, Franco et al 2011, Gohil et al 2018). Sand is an important component of growing media owing to its physical properties of low EC, neutral pH and improve plant growth in a few succulents and cacti (Kapadiya et al 2017, Bell 2021, Lodhi et al 2021).

**Number of roots and length of root:** Among different growing media, number of roots (3.26) and length of root (3.42 cm) significantly increased in haworthia grown in the media M<sub>6</sub> i.e. sand: vermicompost (9:1) at end of experiment (Table 3). Root can be considered a key parameter as it plays an important role for the plant to absorb the nutrient and capture water. Promotion or inhibition of root growth is known to be influenced by the physical and chemical characteristics of growing media like texture, structure, bulk

**Table 3.** Effect of different growing number of roots and root length in haworthia

Treatments	Incremental number of roots	Incremental length of root (cm)
M1	1.35 (1.41)	1.94
M2	1.60 (2.15)	2.25
M3	1.14 (2.68)	2.04
M4	0.96 (0.44)	1.12
M5	1.78 (2.74)	2.83
M6	1.93 (3.26)	3.42
M7	1.61 (2.16)	2.96
CD (p=0.05)	0.33	0.52
CD (p=0.05) (YT)	NS	NS

**Note:** The values in parenthesis are original and outside are arcsine transformed values

**Table 4.** Effect of growing media on EC, pH and bulk density

Treatments	EC (mS/cm)	pH	Bulk density (g/cc)
M1	1.74	6.5	0.18
M2	1.33	6.8	0.30
M3	2.1	6.1	0.19
M4	1.56	6.9	0.25
M5	1.21	7.2	1.32
M6	0.16	6.7	1.70
M7	0.11	7.8	1.73

density, porosity, water-holding capacity, EC, pH, etc. (Larsen and Guse, 1997, Hartmann et al 1997, Giuliani 2024). Thus, the physical properties like low EC and neutral pH of sand+vermicompost (9:1) media and suitable bulk density contributed to better root growth in haworthia.

## CONCLUSION

Among seven different growing media combinations evaluated for haworthia, the growth of haworthia with regard to plant height, plant spread, number of leaves, number of suckers as well as root length and number of roots was found better in media comprising of sand:vermicompost (9:1). Thus, for growing haworthia as pot plant, media consisting of sand: vermicompost (9:1) is highly suitable.

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