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Media Standardization for Propagation of Caralluma (Caralluma Tuberculata)

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Abstract
To study the response of Caralluma (*Caralluma tuberculata*) growth to different media combination with an aim to identify suitable media combination for its propagation. An experiment was conducted at Barani Agricultural Research Station, Kohat during 2012 and 2013. The local wild Caralluma weighing 50g was planted in pots measuring 8"×10" arranged in complete randomized design (CRD) with four replications. Data were recorded on number of sticks plant^{-1}, stick diameter, stick length and fresh yield pot^{-1} for two years. Pooled analysis of variance revealed significant differences among media types for all the traits studied, whereas, for year significant differences were only recorded for stick length and fresh yield pot^{-1}. Year x media interactions was found significant for number of stick plant^{-1}. Maximum values for fresh yield pot^{-1} (403 g), stick length (17.6 cm) and number of sticks plant^{-1} (25) were produced in pots containing media combination of Sand + Silt + Saw Dust + FYM. Significant increase in fresh yield and other yield traits of Carraluma was noticed during the second year in comparison with first year. Furthermore, media type 4 (Sand + Silt + Saw Dust + FYM) showed remarkable results for yield and other traits and could be recommended for propagation of Caralluma.
Keywords: Caralluma, *Caralluma tuberculata*, propagation, media

INTRODUCTION

Caralluma plants are widely distributed in the mediterranean region [1]. The Cara1a= genus (Asciepiadacease) comprises about 120 species, they are fleshy leafless herb of about I5-45 cm height with subterete stems having grooves. Caralluma is also regarded as the synonym of llnucerusia, but it differ from Boucerosia by its habit of inflorescence primarily [2]. In Pakistan two species of the genus Caralluma have been recognized i.e. *Caralhnria luberculala* and *Carallruua edulis* occur in all the four provinces Punjab, Baluchistan, Khyber Pakhtunkhwa and Sindh [3].

Caralluma is reported to have powerful medicinal properties and is used in leprosy, diseases of blood and also as an anthelmintic, alterative and cooling drug [4]. The bitter stem of *C. tuherculala* is also consumed as a vegetable [5]. The local population also use "Clunig" as an antidiabetic vegetable drug [6]. The folkloric medicinal plants can be broadly described as those either available in the market or with drug vendors but their description and uses are not listed in the Unani system of medicine compendia, which is usually comprised of plant based remedies [7]. The enquiries with the drug vendors in Karachi have shown that the plants of Carulluma as such or its decoction are used to ward off diabetes. Furthermore, *C. tuhrrculuiu* is commonly available in the vegetable market of Karachi after rainy season, and this plant is quite popular and well known among those people who are suffering from excessive sugar malaise [8]. Due to its edible value and its reputation as folkloric medicine for the cure of diabetes, rheumatism and disease of blood, the present investigation was carried out for standardization of media for successful propagation of wild Caralluma across two years.

MATARIALS AND METHODS

The present study was conducted in screen house installed at Barani Agricultural Research Station Kohat during 2012 and 2013. The local wild Caralluma weighing 50 g was planted in pots measuring 8"×10" and was arranged in CRD design with four replications. All cultural practices were maintained same in all treatments. Data were recorded on number of sticks plant^{-1}, stick diameter, stick length and fresh yield pot^{-1} for two years.
Two pots per treatments were raised and the following four types of treatments (media) were used.
Media 1:Sand + Silt
Media 2:Sand + Silt + FYM
Media 3:Sand + Silt + Saw Dust
Media 4:Sand + Silt + Saw Dust + FYM

RESULTS

Number of stick plant^{-1} (no.)

Pooled analysis of variance for number of stick plant^{-1} revealed highly significant differences among media types and year x media interactions, whereas year showed non-significant differences for number of stick plant^{-1}

(Table 1). Mean values for number of stick plant^{-1} are given in Table 2. Number of stick plant^{-1} remain constant across two years (20). Maximum number of stick plant^{-1} were recorded in pots having media type 4 (25), whereas minimum values were observed in pots containing media type 1 (15). Furthermore, media type 4 produced maximum stick plant^{-1} during first year (25), which is statistically at par with media type 4 and year 2 and media type 2 and year 1 (each with 24).

Stick diameter (mm)

Combined analysis of variance for stick diameter showed significant differences among media types only, whereas year and year x media interactions were found non-significant for stick diameter (Table 1). Mean values for stick diameter are presented in Table 3. Stick diameter remain static across two years (17 mm). Maximum stick diameter were recorded in pots having media type 3 (18.5 mm), whereas, minimum values were observed in pots containing media type 1 (15.5 mm). Furthermore, media type 3 produced maximum stick diameter during first year (19), while minimum value for recorded for media type 1 and year 2 (15 mm).

Stick length (cm)

Mean squares for stick length depicted highly significant differences among media types and year, whereas, year x media interactions exhibited non-significant for stick length (Table 1). Mean values for stick length are given in Table 4. Stick length significantly increased in length during second year as compared with first year (14 vs.16.62 cm). Maximum stick length were recorded in pots having media type 4 (17.6 cm), whereas, minimum values were observed in pots containing media type 1 (12.25 cm). Furthermore, media type 3 produced maximum stick length during second year (19.50 cm), which is statistically similar with media type 4 and year 2 (18.25 cm) and media type 4 and year 1 (17 cm), while minimum value were recorded for media type 1 and year 2 (12.5 cm).

Fresh yield pot^{-1} (g)

Pooled analysis of variance for fresh yield pot^{-1} revealed significant differences among media types and year, whereas year x media interactions showed non-significant differences for fresh yield pot^{-1} (Table 1). Mean values for fresh yield pot^{-1} are presented in Table 5. Fresh yield pot^{-1} significantly increases during second year as compared with first year (303.13 vs. 334.38 g). Maximum fresh yield pot^{-1} were recorded in pots having media type 4 (403.13 g), whereas, minimum values were observed in pots containing media type 1 (225 g). Furthermore, media type 4 produced maximum fresh yield pot^{-1} during first year (405 g), which is statistically at par with media type 4 and year 2 (401.25 g), while minimum fresh yield pot^{-1} were recorded in pot containing media type 1 and year 2 (242.5 g).

CONCLUSIONS

Significant increase in fresh yield and other yield traits of Caralluma was noticed during the second year in comparison with first year. Furthermore, media type 4 (Sand + Silt + Saw Dust + FYM) showed remarkable results for yield and other traits and could be recommended for propagation of Caralluma.

Table 1. Pooled mean squares for various traits of Carraluma as effected by media types across two years.

SOV	Df	Number of stick plant^{-1}	Stick diameter	Stick length	Fresh yield pot^{-1}
Year (Y)	**1**	116.5^{NS}	15.2^{NS}	41.8**	35089.6*
Media(M)	**3**	0.2**	0.5*	55.2**	6612.5**
Y x M	**3**	70.2**	4.5^{NS}	14.4^{NS}	1027.1^{NS}
Error	**24**	5.8	6.2	7.6	2209.9
CV(%)	**-**	12.2	14.8	18.0	14.8

Table 2. Mean values for number of sticks plant^{-1} as effected by media types across two years.

	Year-1	Year-2	Mean
Media-1	13 E	18 CD	15 C
Media-2	24 AB	16 DE	20 B
Media-3	17 D	21 BC	19 C
Media-4	25 A	24 AB	25 A
Mean	20	20	

$LSD_{0.05}$ for Year: NS
$LSD_{0.05}$ for Media: 2.48
$LSD_{0.05}$ for Year x Media: 3.51

Table 3. Mean values for sticks diameter as effected by media types across two years.

	Year-1	Year-2	Mean
Media-1	16.0	15.0	15.5
Media-2	15.0	17.0	16.0
Media-3	19.0	18.0	18.5
Media-4	18.0	17.0	17.5
Mean	17.0	17.0	

$LSD_{0.05}$ for Year: NS
$LSD_{0.05}$ for Media: 2.56
$LSD_{0.05}$ for Year x Media: NS

Table 4. Mean values for stick length as effected by media types across two years.

	Year-1	Year-2	Mean
Media-1	12 D	12.5 D	12.25 B
Media-2	14 BCD	16.25 CD	15.13 AB
Media-3	13 BCD	19.5 A	16.3 AB
Media-4	17 AB	18.25 A	17.6 A
Mean	14.00 B	16.62 A	

$LSD_{0.05}$ for Year: 2.83
$LSD_{0.05}$ for Media: 4.01
$LSD_{0.05}$ for Year x Media: NS

Table 5. Mean values for fresh yield pot^{-1} as effected by media types across two years.

	Year-1	Year-2	Mean
Media-1	267.5	242.5	255 C
Media-2	367.5	308.75	338.13 B
Media-3	295.5	265	278.8 BC
Media-4	405.0	401.25	403.13 A
Mean	303.13 B	334.38 A	

$LSD_{0.05}$ for Year: 34.30
$LSD_{0.05}$ for Media: 48.51
$LSD_{0.05}$ for Year x Media: NS

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