



RESEARCH ARTICLE

Comparative performance of peace lily (*Spathiphyllum cochlearispathum* (Liebm.) Engl.) under varying shade levels and growing media

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Abstract

The floral performance of *Spathiphyllum cochlearispathum* (Liebm.) Engl. plants were evaluated under different shade intensities and growing media. The study was carried out over 2 consecutive years (First crop from 01/04/2022 to 31/03/2023 and the second crop from 01/04/2023 to 15/05/2024) and the data on different floral parameters like days taken for spathe initiation, days taken for full bloom of the spathe, length of flowering stalk, length of spathe, width of spathe, length of spadix and bloom life were collected. Three shade levels (50 %, 70 % and 85 %) and 4 potting media combinations were used to evaluate various floral parameters. The pooled data from plants grown under 85 % shade (E2) showed early (288.21 days) flowering, whereas the longest flowering stalk (57.29 cm) length and extended bloom life (31.62 days) were seen in plants grown under 70 % shade. Among the potting media, M2 (soil: sand: FYM: perlite, 2:1:1:1) promoted early flowering (288.36 days), better floral traits and longer bloom duration (31.76 days).

Keywords: bloom life; growing media; shade intensities; spadix; *spathiphyllum cochlearispathum*

Introduction

Spathiphyllum cochlearispathum (Liebm.) Engl. is an ornamental plant belonging to the family Araceae, valued for its aesthetic and environmental attributes. It has gained worldwide popularity as one of the widely cultivated houseplants due to its attractive, glossy green foliage and beautiful white flower-spiked inflorescences (1).

The plant's beauty is additionally intensified by the contrast between its dark green leaves and the bright white spathes. Studies have shown that these plants are among the most effective in purifying common indoor contaminants, such as benzene, formaldehyde and trichloroethylene. Some of the life-threatening pollutants include toluene, xylene and p-dichlorobenzene (2). These toxins are frequently contained in household items such as paints, cleaning agents and furniture, posing health risks to humans. The proficiency of *S. cochlearispathum* in the process of phytoremediation, which involves cleansing the air, is the primary reason for which it is used to promote air quality in interiors.

Appropriate shade levels are a crucial factor for the proper growth and flowering of *S. cochlearispathum*. These plants thrive well in low-light conditions and grow better under indirect or

filtered light, as direct sunlight can burn the leaves and inhibit flowering (3). However, inadequate light may fail to induce the plant to flower, resulting in weak plant growth, characterised by a thin and elongated stem. Hence, it appears that the determination of optimum light shade levels is highly essential for the successful production of *S. cochlearispathum* in addition to providing other suitable cultural management practices.

Furthermore, the growing medium used for potted *S. cochlearispathum* is another important factor influencing growth and flowering. The performance of media, however, largely depends on its composition. The potting media used for growing indoor plants can range from 100 % organic, like peat, bark, cocopeat, etc. to approximately 50 % organic and 50 % inorganic matter like perlite, vermiculite, pumice, etc. (4). In addition to providing nutrients, potting media also influence aeration and moisture retention, which ultimately result in better growth and quality of plants. Hence, the standardisation of potting media using appropriate ingredients in the right proportions is also quite essential for pot-grown plants.

The present study was undertaken with the following objectives.

To determine the comparative performance of the plant under 3 different levels of shade.

To evaluate 4 potting media in various combinations influencing the growth and flowering of the plant and to find out the most suitable combination of media exhibiting maximum growth and visual quality of the plant with the production of quality flowers.

Materials and Methods

An experiment was conducted to determine the comparative performance of peace lily under different shade levels and growing media. It was carried out for 2 seasons in the form of a pot culture trial in the terrace garden, Department of Floriculture and Landscaping, Faculty of Agricultural Sciences, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India during the period from April 2022 to May 2024 (First crop from 01/04/2022 to 31/03/2023 and the second crop from 01/04/2023 to 15/05/2024). The trial was conducted as a factorial experiment, following a completely randomized design with 3 replications and consisted of 2 factors: growing environment (i.e., shade levels) and potting media. Significance was assessed at $p \leq 0.05$. The number of pots per treatment was five and the number of pots per replication was 20. In the present investigation, three growing environment conditions, namely E1 (50 % shade level), E2 (70 % shade level) and E3 (85 % shade level), were used. To create 50 % and 70 % shade as required, UV-stabilised agro shade net of green colour creating the desired level of shade was fixed at a height of 3.9 m above the ground level and 85 % shade was naturally available near the staircase situated close to the terrace garden, where the other two shade treatments were imposed. The light intensity in the experimental area was measured using a Kyoritsu Illuminometer Model 5200 and compared with that of the open environment to confirm the required shade levels. Two sensors are present, which were exposed to light to determine the light intensity at different levels (high/low levels).

Before conducting the experiment, light intensity and shade levels were measured at different parts of the building, including the staircase, on 25/3/2022. Several readings were taken at various points and directions. Light intensity was also measured in open conditions under full sun to compare with that of the building shade. The observation was recorded twice a day, i.e., once in the morning between 8 am and 9 am and again between 12 noon and 1 pm. The

average light intensity at different positions inside the building varied from 15–38 % and the corresponding shade levels ranged from 62–85 %. The light intensity recorded under a 50 % shade net was 2200 lux, under a 70 % shade net was 1230 lux and under an 85 % building shade was 620 lux.

Four different growing media were used for this pot culture trial. The details of their composition are as follows: M1- soil: sand: farmyard manure (FYM) at 2:1:1 ($p^H=5.31$, $EC=1082$ mS/cm), M2- soil: sand: FYM: perlite at 2:1:1:1 ($p^H=5.69$, $EC=807.4$ μ S/cm), M3- soil: sand: perlite: cocopeat at 2:1:1:1 ($p^H=5.91$, $EC=233.2$ mS/cm), M4- soil: sand: cocopeat at 2:1:1 ($p^H=5.82$, $EC=221.2$ mS/cm). Different ingredients were mixed on a v/v basis to prepare the growing media as per the treatment schedule.

The suckers of the aforesaid *Spathiphyllum* species were procured from the Department of Floriculture and Landscaping, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar. They were planted in pots according to the treatment schedule under different shade environments at the experimental site. Observations on various flowering attributes and floral characteristics, like days taken for initiation of spathe, days taken for full bloom of spathe, length of flowering stalk, length of spathe, width of spathe, length of spadix, bloom life and number of spathes per clump, were recorded to determine the impact of the growing environment i.e., shade levels and potting media. All the observations on floral parameters were recorded as soon as the flowers appeared on the plant during the flowering seasons and such observations were recorded for 2 consecutive years and the cumulative data for both years were utilised for analysis once using Windostat 9.50 version.

Results

Significant differences were found in various flowering attributes like days taken for full bloom of the spathe, length of the spathe and bloom life among plants grown under different shade levels and growing media.

Days taken for spathe initiation and full bloom of the spathe

The data (Table 1) indicate that various shade levels (E) significantly influenced the time to spathe initiation in *Spathiphyllum* in both years, with $p \leq 0.05$. Pooled data showed that among shade levels, plants under 85 % shade (E3) recorded the earliest spathe initiation (288.21 days) from the date of planting of the young suckers, followed by 70 % shade (E2-289.58 days),

Table 1. Influence of different shade levels and growing media on the days taken for spathe initiation and full bloom of the spathe of *Spathiphyllum*

Treatment	Days taken for spathe initiation			Days taken for the full bloom of the spathe		
	Year 1	Year 2	Pooled	Year1	Year2	Pooled
Shade levels (E)						
E1 (50 % shade)	304.40 ^a	306.74 ^a	305.57 ^a	22.08 ^b	24.23 ^b	23.16 ^b
E2 (70 % shade)	288.45 ^b	290.71 ^b	289.58 ^b	21.23 ^c	22.76 ^c	22.00 ^c
E3 (85 % shade)	287.07 ^b	289.35 ^b	288.21 ^b	25.83 ^a	27.47 ^a	26.65 ^a
SE(m) $\pm$	0.83	1.26	0.99	0.16	0.23	0.16
CD at 5 %	2.44	3.67	2.89	0.48	0.68	0.46
Media (M)						
M1(soil: sand: FYM at 2:1:1)	294.91 ^{ab}	297.83 ^{ab}	296.37 ^{ab}	22.78 ^c	24.66 ^b	23.72 ^c
M2(soil: sand: FYM: perlite at 2:1:1:1)	288.09 ^c	288.63 ^c	288.36 ^c	20.98 ^d	22.32 ^c	21.65 ^d
M3(soil: sand: perlite: cocopeat at 2:1:1:1)	293.00 ^b	295.22 ^b	294.11 ^b	23.82 ^b	25.79 ^a	24.81 ^b
M4(soil: sand: cocopeat at 2:1:1)	297.22 ^a	300.71 ^a	298.97 ^a	24.62 ^a	26.51 ^a	25.57 ^a
SE(m) $\pm$	0.96	1.45	1.14	0.19	0.27	0.18
CD at 5 %	2.81	4.24	3.34	0.55	0.78	0.54

Note: The figures superscripted with the same letters do not differ significantly and the figures with different superscripts are significantly different.

while those under 50 % shade (E1- 305.57 days) took the longest time. However, the time taken for spathe initiation under 70 % and 85 % shade was statistically comparable. Among media, M2 (soil: sand: FYM: perlite = 2:1:1:1) showed the earliest initiation (288.36 days), whereas M4 (soil: sand: cocopeat = 2:1:1) was the latest (298.97 days). The analysed data, presented in Table 1, revealed that during both years of study, the shade levels (E) played a significant role in influencing the number of days to achieve full bloom of the spathe in *Spathiphyllum*. Pooled data showed that the plants bloomed earliest (21.99 days) under 70 % shade (E2) followed by 50 % shade (E1), which took 23.16 days. On the other hand, the maximum delay was noticed under 85 % shade (E3), which took 26.65 days. Among the growing media, M2 (soil: sand: FYM: perlite = 2:1:1:1) performed the best, taking the minimum time to first bloom (21.65 days), while M4 (soil :sand: cocopeat = 2:1:1) took the longest time (25.57 days).

Length of flowering stalk and number of spathes per clump

It was observed that shade levels significantly influenced the flowering stalk length of *Spathiphyllum* in both years of the study (Table 2). Pooled data showed that plants grown under 70 % shade (E2) had the highest stalk length (57.29 cm), followed by 50 % shade (E1) and 85 % shade (E3), which recorded stalk lengths of 50.99 cm and 50.92 cm respectively. Among various media compositions, M2 (soil: sand: FYM: perlite = 2:1:1:1) had the longest stalk (61.16 cm), while the shortest was recorded (46.01 cm) with M4 (soil: sand: cocopeat = 2: 1: 1). The data presented in Table 2 revealed that the level of shade (E) had a significant impact on the number of spathes per clump in *Spathiphyllum*. The pooled

analysis of data showed that plants grown under 50 % shade (E1) had the highest number of spathes (2.413), followed by 70 % shade (E2) at 2.267 and the least was under 85 % shade (E3) at 1.50. Among the media, M2 (soil: sand: FYM: perlite = 2: 1: 1: 1) produced a significantly higher number of spathes (2.467), while M3 (soil: sand: perlite: cocopeat = 2: 1: 1: 1) recorded the lowest number (1.69).

Length and width of spathe

The results presented in Table 3 revealed that shade level (E) had a significant influence on the length of the spathe in *Spathiphyllum*. The pooled data showed that plants grown under 70 % shade (E2) had significantly longer spathes (16.81 cm), followed by those produced under 50 % (E1) and 85 % (E3) shade, which recorded 15.58 cm and 13.86 cm long spathes respectively. Among various growing media tried, M2 (soil: sand: FYM: perlite = 2: 1: 1: 1) had the longest spathe (19.39 cm), whereas M4 (soil: sand: cocopeat = 2: 1: 1) had the shortest one (11.56 cm). Various shade levels had a great influence on the width of the spathe (Table 3). The pooled analysis of data showed that significantly broader spathes (6.68 cm) were observed in plants grown under 70 % shade (E2) and spathe with the least width (5.31 cm) was recorded in plants grown under 85 % shade (E3). Among various media under trial M2 (soil: sand: FYM: perlite = 2:1:1:1) had the maximum width (8.41 cm) and M4 (soil: sand: cocopeat = 2:1:1) had the minimum (3.93 cm).

Length of spadix and bloom life

The analysed data, presented in Table 4, showed that shade levels had a marked influence on the length of the spadix in

Table 2. Influence of different shade levels and growing media on the length of the flowering stalk and the number of spathes per clump of *Spathiphyllum*

Treatment	Length of flowering stalk (in cm)			Number of spathes per clump		
	Year 1	Year 2	Pooled	Year 1	Year 2	Pooled
Shade levels (E)						
E1 (50 % shade)	50.07 ^b	51.92 ^b	50.99 ^b	1.75 ^a	3.24 ^a	2.41 ^a
E2 (70 % shade)	56.48 ^a	58.09 ^a	57.29 ^a	1.73 ^a	2.80 ^b	2.27 ^a
E3 (85 % shade)	49.90 ^b	51.93 ^b	50.92 ^b	1.00 ^b	2.00 ^c	1.50 ^b
SE(m) ±	0.34	0.37	0.34	0.06	0.12	0.08
CD at 5 %	0.99	1.07	1.00	0.17	0.36	0.24
Media (M)						
M1(soil: sand: FYM at 2:1:1)	53.69 ^b	55.53 ^b	54.61 ^b	1.56 ^{ab}	2.84 ^{ab}	2.09 ^b
M2(soil: sand: FYM: perlite at 2:1:1:1)	60.27 ^a	62.04 ^a	61.16 ^a	1.71 ^a	3.22 ^a	2.47 ^a
M3(soil: sand: perlite: cocopeat at 2:1:1:1)	49.58 ^c	51.40 ^c	50.49 ^c	1.24 ^c	2.14 ^c	1.69 ^c
M4(soil: sand: cocopeat at 2:1:1)	45.07 ^d	46.94 ^d	46.01 ^d	1.47 ^b	2.51 ^{bc}	1.99 ^b
SE(m) ±	0.39	0.42	0.39	0.07	0.14	0.10
CD at 5 %	1.14	1.23	1.15	0.20	0.42	0.28

Note: The figures superscripted with the same letters do not differ significantly and the figures with different superscripts are significantly different.

Table 3. Influence of different shade levels and growing media on length of spathe and width of spathe of *Spathiphyllum*

Treatment	Length of spathe (in cm)			Width of spathe (in cm)		
	Year 1	Year 2	Pooled	Year 1	Year 2	Pooled
Shade levels (E)						
E1(50 % shade)	15.13 ^b	16.03 ^a	15.58 ^b	5.35 ^b	6.92 ^b	6.13 ^b
E2(70 % shade)	16.65 ^a	16.98 ^a	16.81 ^a	6.10 ^a	7.26 ^a	6.68 ^a
E3(85 % shade)	12.97 ^c	14.76 ^b	13.86 ^c	4.67 ^c	5.96 ^c	5.31 ^c
SE(m) ±	0.15	0.33	0.21	0.10	0.09	0.08
CD at 5 %	0.43	0.97	0.60	0.30	0.28	0.23
Media (M)						
M1(soil: sand: FYM at 2:1:1)	15.98 ^b	16.77 ^b	16.37 ^b	6.13 ^b	7.54 ^b	6.84 ^b
M2(soil: sand: FYM: perlite at 2:1:1:1)	18.62 ^a	20.17 ^a	19.39 ^a	7.53 ^a	9.28 ^a	8.41 ^a
M3(soil: sand: perlite: cocopeat at 2:1:1:1)	14.00 ^c	14.71 ^c	14.36 ^c	4.47 ^c	5.51 ^c	4.99 ^c
M4(soil: sand: cocopeat at 2:1:1)	11.07 ^d	12.04 ^d	11.56 ^d	3.36 ^d	4.51 ^d	3.93 ^d
SE (m) ±	0.17	0.38	0.24	0.12	0.11	0.09
CD at 5 %	0.50	1.12	0.69	0.35	0.32	0.27

Note: The figures superscripted with the same letters do not differ significantly and the figures with different superscripts are significantly different.

Table 4. Influence of different shade levels and growing media on length of spadix and bloom life of *Spathiphyllum*

Treatment	Length of spadix (in cm)			Bloom life (in days)		
	Year 1	Year 2	Pooled	Year 1	Year 2	Pooled
Shade levels (E)						
E1(50 % shade)	4.37 ^b	5.82 ^b	5.10 ^b	27.92 ^b	30.17 ^b	29.04 ^b
E2(70 % shade)	5.15 ^a	6.62 ^a	5.89 ^a	30.73 ^a	32.52 ^a	31.62 ^a
E3(85 % shade)	3.01 ^c	4.81 ^c	3.92 ^c	25.88 ^c	27.50 ^c	26.69 ^c
SE(m) ±	0.15	0.14	0.13	0.27	0.27	0.25
CD at 5 %	0.44	0.42	0.37	0.78	0.79	0.72
Media (M)						
M1(soil: sand: FYM at 2:1:1)	4.86 ^b	6.45 ^b	5.66 ^b	29.42 ^b	31.64 ^b	30.53 ^b
M2(soil: sand: FYM: perlite at 2:1:1:1)	5.87 ^a	7.40 ^a	6.64 ^a	30.69 ^a	32.82 ^a	31.76 ^a
M3(soil: sand: perlite: cocopeat at 2:1:1:1)	2.89 ^c	4.45 ^c	3.68 ^c	27.07 ^c	28.70 ^c	27.88 ^c
M4(soil: sand: cocopeat at 2:1:1)	3.10 ^c	4.71 ^c	3.90 ^c	25.53 ^d	27.08 ^d	26.31 ^d
SE (m) ±	0.18	0.17	0.15	0.31	0.31	0.28
CD at 5 %	0.51	0.48	0.43	0.90	0.91	0.83

Note: The figures superscripted with the same letters do not differ significantly and the figures with different superscripts are significantly different.

Spathiphyllum during both years of study. The pooled analysis of data indicated that it was maximum (5.89 cm) in plants grown under 70 % shade (E2) and minimum (3.92 cm) in plants under 85 % shade (E3). Growing media M2 (soil: sand: FYM: perlite= 2:1:1:1) had the longest spadices (6.64 cm) and M4 (soil: sand: cocopeat= 2:1:1) had the shortest (3.68 cm).

The analysed data on bloom life of *Spathiphyllum* as influenced by shade levels (E) are presented in Table 4 for both the years of study. The pooled analysis of data indicated that the maximum period of flowering was found in plants grown under 70 % shade (E2- 31.62 days), followed by 50 % shade (E1- 29.04 days) and the minimum was under 85 % shade (E3-26.69 days). In the media, M2 (soil: sand: FYM: perlite=2:1:1:1) gave the highest bloom period (31.76 days) and M4 (soil: sand: FYM: cocopeat=2:1:1) was the lowest (26.31 days).

Discussion

Days taken for spathe initiation and full bloom of the spathe

Pooled data showed that among shade levels, plants under 85 % shade (E3) recorded the earliest spathe initiation (288.21 days) from the date of planting of the young suckers, followed by 70 % shade (E2-289.58 days), while those under 50 % shade (E1- 305.57 days) took the longest time. The early spathe initiation observed under high shade levels, i.e., 70 % or 85 % shade, may be attributed to the optimum light intensity available under these shade treatments, which led to the accumulation of photosynthates, which might have resulted in early initiation of spathe and also enhanced vegetative growth and flower induction, while lower shade levels (50 %) delayed flowering. The superior performance of M2 can be attributed to better aeration and nutrient availability resulting from the use of perlite and FYM. Furthermore, FYM significantly enhances plant flowering, improves soil structure and nutrient uptake and boosts organic carbon, which promotes healthier growth that induces earliness in flowering, improves yield and quality of flowers. Although perlite does not contain nutrients, it improves nutrient retention and release in FYM, thereby promoting better growth and earlier spathe initiation. Similar findings were reported previously which observed that moderate shade and perlite-based media improved growth and flowering in *Spathiphyllum* (5, 6).

Pooled data showed that the plants bloomed earliest (21.99 days) under 70 % shade (E2) followed by 50 % shade (E1), which took 23.16 days. On the other hand, the maximum delay was observed under 85 % shade (E3), with a delay of 26.65 days. The moderate

shade (70 %) favoured early full bloom and was likely associated with the optimum level of light and a favourable microclimate, which increased assimilate synthesis and flower formation. In contrast, heavy shading (85 %) delayed flowering by reducing photosynthesis. As the 70 % shade showed earlier spathe initiation, it took the fewest days for full spathe bloom. Regarding media, perlite and FYM may account for M2's superior performance, providing better aeration, drainage and nutrient balance. The results are consistent with the previous findings which showed moderate shade and nutrient-rich porous media enhanced flowering behaviour in *Spathiphyllum* (7, 8). Earlier authors also noticed the same situation in *Anthurium*, where 70–75 % shade and organic-perlite media improved the quality of flowering and shortened the flowering period (9). Therefore, 70 % shade with media composed of soil: sand: FYM: perlite (2:1:1:1) was found to be the most appropriate for early and uniform blooming in *Spathiphyllum*.

Length of flowering stalk and number of spathes per clump

Pooled data showed that plants grown under 70 % shade (E2) had the highest stalk length (57.29 cm), followed by 50 % shade (E1) and 85 % shade (E3), which recorded stalk lengths of 50.99 cm and 50.92 cm respectively. The protrusion of the more extended flowering stalks at a shade level of 70 % could be explained by the favourable light intensity, which promoted balanced vegetative growth and cell elongation. An excess or a lack of light probably limited stem growth. The results can be compared with those of previous studies that reported increases in stalk length and flower quality of *Anthurium* under 70–75 % shade (10–12). Therefore, 70 % shade was the most appropriate combination to produce longer and solid flowering stalks in *Spathiphyllum*, as observed in the present investigation. Media M2 with FYM and perlite as ingredients might have facilitated better root aeration, moisture retention and nutrient supply, thereby improving performance. The nutrient composition of M2 and M3 media was similar, except for one component: M2 contains FYM, whereas M3 contains cocopeat. Since the nutrient composition of FYM is better than that of cocopeat (it contains a higher amount of macro and micronutrients), it might have contributed to the production of a larger number of spathes.

The pooled analysis of data showed that plants grown under 50 % shade (E1) had the highest number of spathes (2.413), followed by 70 % shade (E2) at 2.267 and the least was under 85 % shade (E3) at 1.50. Due to higher light intensity under 50 % shade compared to 70 % and 85 % shade, photosynthesis might have been higher, helping produce more spathes. Moderate shading (70 %) promoted

the growth of additional spathes, likely due to balanced light levels that enhanced photosynthate accumulation and hormonal function (11). Earlier reports also indicated similar increases under moderate shade and aerated organic medium (13, 14).

Length and width of spathe

The pooled data showed that plants grown under 70 % shade (E2) had significantly longer spathes (16.81 cm), followed by those grown under 50 % (E1) and 85 % (E3) shade, which recorded spathes of 15.58 cm and 13.86 cm long respectively. Medium-light intensity (70 % shade) supporting moderately good floral growth was associated with longer spathe length, whereas excessively high or insufficient light inhibited spathe growth. Previous studies also reported similar findings in *Anthurium*, where moderate shading increased spathe length (9, 10). The longer spathes in M2 media may be due to the high quality of M2 media, which resulted in better aeration, water-holding capacity and nutrient availability, created by perlite and FYM, leading to the production of better-quality floral structures.

The pooled analysis of data showed that significantly broader spathes (6.68 cm) were observed in plants grown under 70 % shade (E2) and the spathe with the least width (5.31 cm) was recorded in plants grown under 85 % shade (E3). The wider spathe width is probably due to moderate light enhancing assimilate production and floral organ development, whereas extreme light levels might restrain growth (11). Thus, 70 % shade proved to be the most favourable for improving spathe width. The use of perlite in the media, particularly M2, enhanced root aeration and drainage, thereby improving spathe size, consistent with the finding that perlite-based substrates increase flower size in ornamentals (15).

Length of spadix and bloom life

The pooled analysis indicated that it was maximum (5.89 cm) in plants grown under 70 % shade (E2) and minimum (3.92 cm) in plants grown under 85 % shade (E3). Due to longer spathes in 70 % shade, the spadix grows proportionally to the spathe. The intermediate shade (70 %) probably provided the best environment for spadix elongation, balancing light-independent assimilate production and flower organ formation (11). The greater growth of the amended perlite medium (M2) indicated that improved root aeration and nutrient supply promoted spadix development, as observed in other studies on related ornamental crops (13).

The pooled analysis of data indicated that the longest flowering period was observed in plants grown under 70 % shade (E2- 31.62 days), followed by 50 % shade (E1- 29.04 days) and the shortest was under 85 % shade (E3- 26.69 days). The low respiration and transpiration rates under moderate shade might have contributed to an extended bloom life, as reported in earlier studies, who found that the long bloom period in 70 % shade might be attributed to reduced heat stress and slower senescence in moderate light, which preserved pigment stability and water balance (15, 16). Other researchers reported similar results in *Spathiphyllum* (13) and in *Anthurium* (17), where moderate shade led to better floral longevity. Therefore, 70 % shade was found to be most appropriate for prolonging the bloom's lifespan in *Spathiphyllum*. The extended bloom period in the M2 medium could be attributed to its improved aeration and nutrient supply, which enable sustained metabolic activity.

Conclusion

Based on the results of the present study it was concluded that growing *Spathiphyllum* under 70 % shade using soil: sand: FYM: perlite (2:1:1:1) as a growing media can be recommended to the amateurs and commercial growers for raising *Spathiphyllum* for interiors, besides the results of the study would be of immense help to the nursery growers for profitable production of peace lilies on a commercial scale for obtaining higher returns. It can also be recommended to farmers through policymakers (or government officials of the horticulture department) to promote this underutilised crop for protected cultivation, which may add to the existing cut-flower industry.

Authors' contributions

LPKV carried out the experimental study, collected and compiled the data and drafted the initial manuscript. CRM conceived and designed the study, provided intellectual input throughout the research and contributed to manuscript drafting and revision. SB conducted thorough proofreading and critical editing of the manuscript. KST and PKN assisted with data analysis, interpretation of results and coordination of research activities. AP assisted in field observations and data recording. SKS and SM were responsible for preparing the tables and formatting the manuscript for submission. All authors have read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interest to declare.

Ethical issues: None

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