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Araştırma Makalesi

The Emotional Effects of Growing Ornamental Plants on People in the Pandemic Process

Tuba TURKOGLU[1]*, Gülçin BEKER AKBULUT[1]

[1]Malatya Turgut Ozal University, Battalgazi Vocational School, Park and Garden Plants Department, Battalgazi, Malatya, Turkey

*Sorumlu Yazar: tuba.turkoglu@ozal.edu.tr

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ABSTRACT

As in many countries around the world, the pandemic caused by the SARS-CoV-2 virus caused mandatory quarantine in our country. One of the suggested methods to stop the disease's spread, social isolation, had negative psychological effects like fear, depression, and stress. This study was evaluated the role of keeping and growing plants at home during the quarantine period because of the COVID-19 outbreak. This survey study: with behavioural, social, and demographic variables in mind, it enabled an assessment of the emotional effects of growing ornamental plants on human beings. 558 individuals participated in the poll. The statistical application SPSS v26 (Statistical Program in Social Sciences) was used to analyze the study's data. The level of meaningfulness for comparison tests was taken as (p) 0.05. Cronbach Alpha (α) is calculated at 0.954. The AVE value in the study was calculated to be 0.517 and the CR to be 0.973, and the questionnaire used appears to be valid and reliable. According to the data gathered from survey participants, growing ornamental plants, particularly during the pandemic period, felt good and had a positive impact on mental health.

Key words: Covid-19, Emotional impact, Quarantine, Pandemic, Ornamental Plant

Pandemi Sürecinde Süs Bitkileri Yetiştirmenin İnsanlar Üzerindeki Duygusal Etkileri

ÖZ

Dünya çapında birçok ülkede olduğu gibi ülkemizde de SARS-CoV-2 virüsünün neden olduğu pandemi, zorunlu karantinaya sebep oldu. Hastalığın yayılmasını engellemek için önerilen uygulamalardan biri olan sosyal izolasyon; korku, depresyon ve stres gibi psikolojik yansımalara neden oldu. Bu çalışmada, COVID-19 salgınının bir sonucu olarak, karantina döneminde evde bitki bulundurmanın ve yetiştirmenin rolü değerlendirildi. Bu anket çalışması; davranışsal, sosyal ve demografik değişkenler göz önünde bulundurularak, süs bitkileri yetiştirmenin insan üzerindeki duygusal etkilerinin değerlendirilmesini sağladı. Ankete 558 kişi katıldı. Araştırmaya alınan verilerin analizleri SPSS v26 (Statistical Program in Social Sciences) programı ile gerçekleştirilmiştir. Karşılaştırma testleri için anlamlılık düzeyi (p) 0,05 olarak alınmıştır. Cronbach Alfa (α) değeri 0,954 olarak hesaplanmıştır. Çalışmada AVE değeri 0,517 ve CR değeri ise 0,973 olarak hesaplanmış olup, kullanılan anketin geçerli ve güvenilir olduğu görülmektedir. Anket katılımcılarından elde edilen verilere göre, özellikle pandemi döneminde süs bitkileri yetiştirmenin iyi hissettirdiği ve ruh sağlığını olumlu etkilediği sonucu elde edildi.

Anahtar kelimeler: Covid-19, Duygusal etki, Karantina, Pandemi, Süs Bitkisi

INTRODUCTION

Plants that form one of nature's cornerstones have an important place in human life, especially in nature human relationship. Ornamental plants have had various uses for centuries. The importance of ornamental plants that make up green spaces along with rapid urbanization around the world in recent years continues to grow by the day (Puplampu et al., 2021). Today, ornamental plants play an active role in addressing the longing for nature and making urban environments more habitable (Korkut and Inan, 1995; Yazgan et al., 2005). Ornamental plants enhance and revitalize the areas where they are used, giving them characteristics in aesthetic and functional terms (Akça and Gulgün, 2019). Indoor ornamental plants are those that have decorative leaves, flowers, or trunks suitable for growing in different pots, containers, or crates. People spend time in urban life mostly in enclosed environments.

The coronavirus outbreak caused by SARS-CoV-2 was declared by the World Health Organization (WHO) on 30 January 2020 and was considered a pandemic on 11 March that year (Yu et al., 2020). The term pandemic refers to the geographical distribution of the disease, meaning the virus causes outbreaks in various parts of the world (PAHO 2020). In view of the Covid-19 pandemic, which causes various negatives in our country as in many countries around the world; people's social lives are constrained by enclosed spaces and home living becomes reliable. But spending time indoors can negatively affect individuals psychologically. It is directly influential to human health and performance because indoor ornamental plants are living beings where humans relate to nature longing and nature. While the quarantine process has proven to be a key factor in controlling the spread of the disease, it has also led to the repercussions of psychological problems and the emergence of unintended effects due to forced stay-ins (Shigemura et al., 2020). But during the quarantine period they observed that it was beneficial to have an open space, such as a terrace, or a home with green space (Bezerra et al., 2020). The detachment of humans from their usual habitat has increased the time spent indoors. Living in environments where plants are little or no use can lead to negative behaviours such as fear, frustration, or hostility. House quarantines during the COVID-19 outbreak process have caused these negative emotions to increase (Brooks et al., 2020). Therefore, in such difficult conditions, the inclusion of natural and living elements such as plants can restore nature to human habitats and reconnect humans with natural environments. Such connections have been cited as causing positive value changes in cognition and emotion, expressing a positive impact on stress level and health (Grinde and Patil, 2009).

It concluded that the most noticeable effect of indoor plants in particular on people's behaviour is their capacity to increase positive emotions and reduce negative emotions. For example, a decrease in the perception of pain, fear, unhappiness and aggression was found to be associated with the presence of indoor plants (Burchett et al., 2008). Furthermore, vegetation-enriched indoor environments appear to reduce stress relative to plant-free interiors (Park et al., 2008; Thomsen et al., 2011). Connecting with nature is part of the human development process, and limiting access to green spaces in times of social isolation tends to aggravate the damage to people's physical and mental health. Moving nature indoors can effectively increase contact with the natural environment, which can be beneficial for health and comfort (Deng and Deng, 2018).

In this study, Covid-19 was examined to determine whether caring for and cultivating ornamental plants caused people to experience positive emotions, particularly during this time when the quarantine process was stressful and anxiety levels were high. It was assessed whether cultivating and caring for ornamental plants was preferable as a method of easing human stress and anxiety.

MATERIALS and METHODS

Survey Design and Survey Distribution

In our study, the survey is a total of 25 questions distributed across two different sections. Part one of the survey consists of 5 questions related to sociodemographic information. The purpose of the use of the sociodemographic data form is to learn in detail about individuals contributing to the questionnaires administered. Information such as age, gender, education and occupation were also asked to be reached for use during the evaluation phase of this study. In the second part; In a 5 Point Likert Scale consisting of 20 closed-ended questions (1; I strongly disagree, 2; disagree, 3; I'm indecisive, 4; I agree, 5; I strongly agree) used a previously unused form that was prepared. The second part consisted of a series of questions aimed at determining the emotional state of participants during the COVID-19 quarantine period and its association with and relation to plant care. In this part, it was attempted to establish that there was a positive emotional state of participants during the pandemic period and a potential association between plants.

The survey was developed online using Google Forms. At the start of the survey, participants were presented with the justification and purposes of the study, while also providing general information such as the privacy of the research and the intended management of the data collected. Distribution of the survey was

conducted mainly through social networks (WhatsApp, Twitter, Facebook). Other communication channels were also used, such as emails and links on web pages.
The ethics committee document of this study was obtained at the meeting of the Social and Human Sciences Research Ethics Committee of Malatya Turgut Özal University, dated 06.10.2021.

Data Processing and Statistical Analysis

The number of samples received was sufficient, according to power analysis. The power analysis calculates the statistical strength of the sample size (Faul et al., 2009). The sample of this study was determined by power analysis. According to the calculation using the G * power 3.1 program; At 0.20 impact magnitude, 0.05 error share, 0.95 confidence level, 0.95 universe representation force, the sample size was set at 560 (Faul et al., 2009). Participants were chosen based on a sampling method based on a non-probable voluntary basis. Analyses of the data received in the study were conducted through the SPSS v26 (Statistical Program in Social Sciences). It was checked with the Kolmogorow Smirnov Test (Alpar, 2020) whether the data received in the study fit the Normal distribution. The level of meaningfulness for comparison tests was taken as (p) 0.05. Because Normal in variables did not provide distribution ($p > 0.05$), the analysis was continued with non-parametric testing methods. Comparisons in independent binary groups; was done by Mann Whitney U test as the assumption of normality was not provided. In independent multiple groups, comparisons were analyzed for the Kruskal Wallis test. The Bonferroni corrective p value was used and calculated with "(0.05/binary comparison)" as the p value would increase depending on the number of comparisons in variables with a difference (Aktürk and Acemoğlu, 2011).

Validity analysis calculated two values, CR (Composite Reliability) and AVE (Average Variance Extracted). Results from the CR value analysis, which shows the degree to which a hidden variable is represented by the observed variables that make up itself, often draw parallels with the Cronbach α values calculated. CR results are required to be 0.70 and above. The value of AVE, which theoretically indicates the average variance a non-observable structure can explain in the observed variables associated with, should be greater than the unexplained variant and 0.50. Cronbach Alpha (α), calculated from 0.90 to 1.00, expresses excellent reliability (Kılınç et al., 2019). Cronbach Alpha (α) was calculated at 0.954. The study calculated the AVE at 0.517 and the CR at 0.973, suggesting that the questionnaire used was valid and reliable.

RESULTS

Sociodemographic Characteristics of Participants

Demographics of the participants in the study were provided in Table 1. The 558 respondents took part. Table 1 showed 59.5% women and 40.5% men. When we examined the age groups, it was determined that more than half (53%) were between 31 and 45 years of age, 61.1% were married and 59.6% of college graduates, and 46.1% were civil servants.

Table 1. Demographics

Variable	Groups	Number	%
Gender	Male	226	40.5
	Female	332	59.5
Age Groups	16-30 Age	175	31.4
	31-45 Age	295	52.9
	46-60 Age	70	12.5
	61 and older	18	3.2
Marital Status	Married	218	39.1
	Single	340	60.9
Education	Primary	23	4.1
	High school	86	15.4
	University	332	59.5
	Master's	117	21.0
Occupation	Officer	257	46.1
	Retired	17	3.0
	Housewife	47	8.4
	Student	105	18.8
	Unemployed	18	3.2
	Other	114	20.4
Total		**558**	**100.0**

Comparison of Total Score by Gender

The study tested whether participants had differences between men and women based on the total scores of the survey prepared to measure the emotional effects of growing ornamental plants during the pandemic period, and the results were also given in Table 2. Statistically significant difference was found between women and men ($p < 0.05$), according to data obtained.

Table 2. Comparison of Total Score by Gender

Total_Points	Male	Female	p value
Avg	61.58	72.17	
M	65.00	75.00	
Sd	19.99	15.40	<0.001*
Min.	20.00	20.00	
Max.	100.00	100.00	

Avg; Average, sd; standard deviation, M; median, Min; lowest score, Max; Highest score received, Test Value; Mann Whitney Test, p; statistical significance, * $p < 0.05$; there are statistically significant differences between the groups.

Comparing Total Score by Age

The study tested whether participants had differences between age groups based on the overall scores of the survey prepared to measure the emotional effects of growing ornamental plants during the pandemic period, and the results were given in Table 3. Statistically significant difference was determined between age groups based on the total scores of the survey prepared based on data from the study participants ($p > 0.05$).

Table 3. Comparison of Total Score by Age

Total_Points	16-30 Age	31-45 Age	46-60 Age	61 and older	p value
Avg	69.90	65.57	70.21	76.71	
M	75.00	71.00	70.00	82.00	
sd	17.33	19.28	14.33	15.42	0.123
Min.	20.00	20.00	26.00	43.00	
Max.	100.00	100.00	100.00	96.00	

Avg; Average, sd; standard deviation, M; median, Min; lowest score, Max; Highest score received, Test Value; Kruskal Wallis Test, p; statistical significance, * $p < 0.05$; there are statistically significant differences between the groups.

Comparing Total Score by Marital Status

The study tested whether participants had a difference between married and single people based on the total scores of the survey prepared to measure the emotional effects of growing ornamental plants during the pandemic period, and the results were given in Table 4. No statistically significant differences were detected between married people and singles based on the total scores of the survey prepared based on data from the study participants ($p > 0.05$).

Table 4. Comparison of Total Score by Marital Status

Total_Points	Married	Single	p value
Avg	68.89	67.19	
M	72.50	71.00	
Sd	18.65	17.84	0.139
Min.	20.00	20.00	
Max.	100.00	100.00	

Avg; Average, sd; standard deviation, M; median, Min; lowest score, Max; Highest score received, Test Value; Mann Whitney Test, p; statistical significance, * $p < 0.05$; there are statistically significant differences between the groups.

Comparing Total Score by Educational Status

The study tested whether the participants were differentiated between their educational status based on the overall scores of the survey prepared to measure the emotional effects of growing ornamental plants during the pandemic period, and the results were also given in Table 5. Accordingly, no statistically significant differences were determined between the educational status of the participants based on the overall scores of the prepared survey ($p > 0.05$).

Table 5. Comparison of Total Score by Educational Status

Total_Points	Primary	High school	University	Master's	p value
Avg	72.13	70.21	67.48	66.44	
M	72.00	73.00	72.00	70.00	
sd	16.69	15.51	18.64	18.74	0.566
Min.	21.00	30.00	20.00	20.00	
Max.	98.00	100.00	100.00	100.00	

Avg; Average, sd; standard deviation, M; median, Min; lowest score, Max; Highest score received, Test Value; Kruskal Wallis Test, p; statistical significance, * $p < 0.05$; there are statistically significant differences between the groups.

Comparing Total Score by Occupation Groups

The study tested whether the participants were differentiated between occupational groups based on the total scores of the survey prepared to measure the emotional effects of growing ornamental plants during the pandemic period, and the results were given in Table 6.

Table 6. Comparison of Total Score by Occupational Groups

Total_Points	Officer	Retired	Housewife	Student	Unemployed	Other	p value
Avg	65.04	75.50	75.39	70.52	78.69	66.07	
M	70.50	75.00	77.00	75.00	82.00	70.00	
Sd	18.31	16.31	14.39	16.98	14.15	19.22	0.001*
Min	20.00	43.00	37.00	20.00	42.00	20.00	
Max	100.00	97.00	100.00	100.00	96.00	100.00	
Difference	**Civil Servant - Housewife, Civil Servant – Unemployed**						

Avg; Average, sd; standard deviation, M; median, Min; lowest score, Max; Highest score received, Test Value; Kruskal Wallis Test, p; statistical significance, * $p < 0.05$; there are statistically significant differences between the groups.

Statistically significant variation was found between occupational groups based on the total scores of the survey prepared to measure the emotional effects of growing ornamental plants during the pandemic period of the participants in the study ($p < 0.05$). The Bonferroni corrective p value was calculated to find out which binary groups were the difference. Calculated as $\binom{6}{2}= 15$, $\alpha_{BD}=0.05/15 = 0.003$ because the variable group number is 6 and the comparison number is 2. After the Kruskal-Wallis test, the result was decided by comparing the p-values obtained by the Mann-Whitney test with the value 0.003 found. According to the binary comparisons;

On points;

*Statistically significant variation was found between the officer and the housewives ($p < 0.003$).

*Statistically significant variation was found between the officer and the unemployed ($p < 0.003$).

*Other binary comparisons, however, found no statistically significant differences ($p > 0.006$).

Table 7. Respondents' responses to survey questions (%)

Questions	I strongly disagree	I do not agree	I'm indecisive	I agree	I strongly agree
1- I was interested in growing ornamental plants before the pandemic.	19.1	24.6	7.3	32.9	16.1
2- I started buying during the pandemic process when I wasn't buying any flowers.	24.2	34.4	7.2	26.2	8.1
3- I became more interested in growing ornamental plants during the pandemic period.	18.9	24.8	7	32.9	16.4
4- During the pandemic period, my time devoted to home plant care increased.	16.8	22.9	7.5	36.2	16.6
5- The number of plants I grew during the pandemic process has increased	16.9	25.7	6.8	34.5	16.2
6- During the pandemic period, the plants I grew in my home positively affected my mental health.	14.7	16.5	10.9	38.4	19.5
7- I'm happy that the ornamental plants I grow at home are colored.	9.3	7.9	6.8	42	34
8- Growing ornamental plants during the pandemic process improved my sleep quality.	16.6	27.2	33.3	15	7.9
9- In my online work environment during the pandemic process, I was positively impressed by the presence of ornamental plants.	13.7	18.3	16.2	36.9	14.9
10- During the pandemic process, I think ornamental plants also develop positive emotions in children.	8.1	9.7	20.6	44.7	17
11-A beautiful environment of plants on the balcony comforts me.	4.7	4.1	5	43.9	42.3
12-I think ornamental plants are a reflection of nature in our home.	5.2	5.5	9.3	44.7	35.2
13- The ornamental plants I grew in my home during the pandemic period satisfied my longing for nature.	11.8	19.1	17.5	31.3	20.2
14- I love growing plants in my house (on my balcony).	7.9	8.1	10.7	41.3	32
15- I prefer flowering species when buying ornamental plants.	6.1	11.2	16.4	43	23.4
16- I prefer decorative leafy species when buying ornamental plants.	6.8	16	24.1	38.2	14.9
17- I prefer indoor-grown species in the ornamental plant selection	6.1	13.6	15.4	47.7	17.3
18- On special occasions during the pandemic process, I sent the ornamental plant as a gift.	15.2	31.4	11.4	31.3	10.7
19- I recommend growing ornamental plants.	6.3	5.5	13.1	37.4	37.7
20- After the pandemic, I'll continue to grow ornamental plants.	8.2	10	16.7	33.1	32

Emotional State and Attitudes to Ornamental Plants During the Covid-19 Pandemic Period

The results containing the specified variables based on the survey study we conducted were presented in Table 7. In Table 2, with the 49% answer given to the first question, the interest in ornamental plants was less before the pandemic; In the second question, 34.3% showed that there was not much change when we compared the attitude of ornamental operation to the pre-pandemic attitude. With the 49.3% answer to the 3rd question, your interest increased with the pandemic process; With the 42.8% answer given to the 4th question, the time allocated for plant care increased with the pandemic; The 5th question showed an increase in the number of plants grown with 40.7% answers. These data concluded that the majority of the respondents spend more time and interest in growing ornamental plants during the pandemic period. Especially 6th question, " The plants I grew in my home during the pandemic period positively affected my mental health " showed that, depending on the 57.9% answers given to the question, people growing ornamental plants during

the pandemic process significantly affected their spirituality. 7th question with 76% answers; that the colors of plants affect people positively; 8th question answered 33.3% that they were undecided about increasing sleep quality; In the 9th (41.8%) and 10th (61.7%) questions, it was concluded that ornamental plants create positive emotions and relieve people in order to get rid of negative emotions during the pandemic process. The use of plants on the balcony with 86.2% answers in the 11th question; In the 12th question, with 79.9% answers, the use of plants at home; In the 13th question, 51.5% answered that plants satisfy the longing for nature, and in the 14th question, 73.3% answered that it was preferred to grow plants on the balcony. These results showed that ornamental plants play an important role in eliminating the longing for nature, especially in indoor environments. In the 15th question, with 66.4% answers, it was stated that especially flowering species were preferred in the preference of ornamental plants; Depending on the 16th and 17th questions, it was determined that indoor plant species were preferred more by 65% and decorative leafy plant species were preferred by 53.1%. In the 18th question, 42% of the respondents stated that they send ornamental plants on special occasions. The answers of the participants to the 19th (75.1%) and 20th (65.1%) questions showed that they will continue to grow ornamental plants after the pandemic process and recommend them to everyone. In most cases I agree with the most frequent response to survey questions.

DISCUSSION

The findings of the studies revealed that people's contact and interaction with nature had a positive impact on their health and tranquillity. The COVID-19 pandemic has emerged as a unique global crisis, depriving people worldwide of the possibility of visiting public green spaces for an extended period of time. So, under certain circumstances, it provided an opportunity to conduct research on the extent of nature's impact on the living standards of the public within a household. A study by Soga et al., (2021) examined the impact of having a green view from home and exposure to greening during the COVID-19 quarantine. The majority of respondents (73.7%) agreed that having home vegetation contributed positively to their mood during the COVID-19 pandemic, while only 3.5% disagreed. During this COVID-19 crisis, many (more than 7) plants showed positive (calmness, optimism, and joy) and negative (stress, sadness, fear, and depression) emotions in those with no or very few (less than 3) plants at home (Soga et al., 2021). As a result of our study, there have been parallel results. Similar questions were asked as shown in Table 7, and it was found that growing ornamental plants at home, in line with the answers obtained (51.5% - 86.2%), constitutes relaxing, peaceful and positive emotions. The proportion of negative respondents, on the other hand, was found to be as low as 4.7%. Benefits to mental health arising from interaction between humans and nature; can occur through multiple psychological causal mechanisms, such as stress reduction or renewal of cognitive capacities. Positive effects generated by indoor plants depending on their visual appearance, emotional responses to visual stimuli deemed aesthetically pleasing will be able to contribute to lifting the state of tension (Grinde and Patil, 2009; Bratman et al., 2019). In Table 7 of our survey study in 15^{th} ,16^{th} and 17^{th} questions a large majority of participants in the questions preferred indoor plants, but did not make a distinct distinction between both flowering and decorative leafy species. Another study that was more specific was that the landscape around households also positively affected the emotional state of its residents. The results showed that windows overlooking a natural landscape could potentially make a positive contribution to the mental health and well-being of the city's residents (Kaplan, 2001; Olszewska-Guizzo et al., 2018). For example, psychological responses in workplace settings with indoor plants or windows overlooking a natural landscape were examined. Study participants reported becoming less anxious both when looking at a natural view from the window and when indoor plants were found in their work environment (Chang and Chen, 2005). In closed environments enriched with vegetation, stress decreases compared to non-plant enclosed areas (Park et al., 2008; Thomsen et al., 2011). In the survey the questions 12 and 13 concluded that the plants cultivated satisfied the yearning for nature (79.9%) and that a beautiful environment of plants on the balcony was comforting (73.3%). Yazıcı and Saglamer (2022), in their study on women's preference for indoor ornamental plants during the covid-19 pandemic period, seven rooms were designed with pre-prepared indoor ornamental plants and presented to the surveyed women to determine the effects of the Covid-19 pandemic and women's preferences for ornamental plants. It has been determined that indoor ornamental plants have positive effects on people and should be considered necessary in terms of health and environment during the Covid-19 pandemic (Yazici and Saglamer, 2022). In our study, women participated at a rate of 59.4%. The answers given to questions 11 to 17 of our survey questions are consistent with the results obtained from this study and support these results. One study reported that gardening is one of the most effective activities to mitigate the unpleasant effects of social isolation. Half of the participants spent more time at home on plant care during the quarantine period, which may have free time, it said (Lades et al., 2020). Plant care on people's emotional well-being due to COVID-19 can not only be considered a fun activity, but also a way to focus the mind on a

particular task, thereby diverting attention away from the COVID-19 condition and helping to suppress negative emotions. Perhaps this is why gardening has been described as one of the activities that exhibits an increasing positive impact on emotional wellbeing (Ambrose et al., 2020). Based on statistical analyses of the data collected in our study, we can say that a large majority of participants had positive emotional effects on plant breeding during the pandemic process. In studies; visual and physical interaction with plants has been associated with increased positive behaviors and emotions in connection with decreased negative emotions, such as fear and stress (Adachi et al., 2000; Kamitsis and Francis, 2013). However, in contemporary societies, increased time spent indoors often results in separation from the natural environment. The COVID-19 pandemic showed negative emotions such as fear, frustration, uncertainty and stress during the quarantine process (Brooks et al., 2020). Thus, in such difficult conditions, the inclusion of natural and living elements, such as plants, being able to introduce nature into human habitats causes positive changes in emotion and expresses a beneficial effect on stress level, health (Grinde and Patil, 2009). In line with the results of the other researchers in our study, 89.5% of the respondents were definitely in favor of requiring those who received ornamental plants for their psychological well-being. Studies have concluded that indoor plants significantly increase positive emotions and reduce negative emotions. In this regard, a high proportion of participants, depending on data collected from the survey results, found that growing ornamental plants felt good and positively affected mental health, especially during the pandemic period.

CONCLUSION

It has been determined that ornamental plants have a stress-reducing or restorative effect when individuals are under stress in closed areas. Ornamental plants in gardens or in pots inside homes add beauty and bring more peace of mind, encouraging creativity and happiness. These features are quite important in that they help confront the challenges of the crisis as a result of social isolation in the COVID-19 pandemic. The study concluded that growing ornamental plants, one of the practices for reducing anxiety and stress in humans during the pandemic process, was emotionally positive. In line with the results obtained, it is necessary to support the cultivation of ornamental plants with more extensive research in situations where people are stressed. Especially since growing ornamental plants suppresses negative emotions, it is important to use it in solving various problems. This study can be used as an important resource for the continuation of more comprehensive studies. Growing ornamental plants, in particular, has a variety of applications because it suppresses negative emotions.

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YAZAR ORCID NUMARALARI

Tuba TURKOGLU : http://orcid.org/0000-0001-6481-6218

Gülçin BEKER AKBULUT : http://orcid.org/%200000-0003-3529-5999

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