



Consumption of Ornamental Plants and the Initial Impacts of Covid-19 Pandemic

Bruno Rodrigues Pereira¹, Renata Alves de Aguiar¹ & Larissa Leandro Pires¹

Recebido em 21/01/2021 – Aceito em 10/12/2021

¹ Universidade Federal de Goiás/UFG, Escola de Agronomia/EA, Setor de Horticultura, Goiânia/GO, Brasil. CEP: 74.690-900. <brunorodrigues.eng@discente.ufg.br, renata_aguiar@ufg.br, larissa@ufg.br>.

ABSTRACT – The importance of ornamental plants goes from the aesthetic issue to the improvement of climatic conditions in the environments, with beneficial effects on human health. The market for flowers and ornamental plants had a drastic reduction due to the isolation and social distance required with the occurrence of the Covid-19 pandemic in many cities in Brazil and the world. The objective was to characterize ornamental plants consumption and to estimate the pandemic initial effects. Through an online questionnaire, quantitative data were collected regarding the profile characterization of 537 consumers, the consumption habit, and the purchase of ornamental plants to verify the initial effect of the pandemic (April/May 2020) on the final consumer of ornamental plants. The questionnaire was available on google forms, being disseminated via e-mail and social networks to as many people as possible. According to the results, there is a preference for potted plants, mainly orchids, and succulents, acquired especially in flower shops, considering as the main attributes for the purchase, the visual appearance, and the price. The ornamental plants' purchase frequency is especially biannual, despite their strong relationship with people's quality of life. The social isolation resulting from the Covid-19 pandemic caused changes in habits, leading to a greater need to have plants at home, thus increasing the consumption of ornamental plants and the preference for local production.

Keywords: Floriculture; coronavirus; landscaping; cut flower; potted plant.

Consumo de Plantas Ornamentais e os Impactos Iniciais da Pandemia de Covid-19

RESUMO – A importância das plantas ornamentais vai desde a questão estética até a melhoria nas condições climáticas dos ambientes, com efeitos benéficos à saúde humana. Devido à pandemia de Covid-19, o mercado de flores e plantas ornamentais teve uma redução drástica com o isolamento e distanciamento social em muitas cidades do Brasil e do mundo. Com o objetivo de caracterizar o consumo de plantas ornamentais e estimar o efeito inicial da pandemia na sua aquisição, um questionário aplicado on-line foi respondido por 537 consumidores no início da pandemia, de abril a maio de 2020. Foram levantados dados quantitativos referentes à caracterização do perfil do consumidor, do hábito de consumo e aquisição de plantas ornamentais. O questionário ficou disponível no google forms, sendo divulgado via e-mail e redes sociais a um maior número possível de pessoas. Por meio de estatística descritiva foi possível caracterizar o perfil do consumidor final de plantas ornamentais e verificar que essas plantas são adquiridas pelo simples fato de se gostar desse tipo de vegetal e para embelezamento. Há uma preferência pelas envasadas, principalmente orquídeas e suculentas, adquiridas especialmente em floriculturas, considerando-se como atributos de compra a aparência visual e o preço. A frequência de compras das plantas ornamentais é semestral, apesar da alta relação dessas com a qualidade de vida das pessoas. O isolamento social advindo da pandemia de Covid-19 provocou mudanças de hábitos, levando a uma maior necessidade de se ter plantas em casa, aumentando, assim, o consumo de plantas ornamentais e a preferência pela produção local.

Palavras-chave: Floricultura; coronavírus; paisagismo; flor de corte; planta envasada.

Consumo de Plantas Ornamentales y sus Primeros Impactos Causados por la Pandemia de Covid-19

RESUMEN – La importancia de las plantas ornamentales cubre situaciones que van desde la estética hasta la mejora de las condiciones climáticas del ambiente, otorgando beneficios para la salud humana. Con la pandemia del Covid-19, el mercado de las flores y de las plantas ornamentales tuvo una drástica reducción producto del aislamiento y del distanciamiento social en muchas de las ciudades de Brasil y del mundo. El objetivo fue caracterizar el consumo de las plantas ornamentales y evaluar el efecto inicial de la pandemia en su adquisición o compra, mediante la administración de formularios on-line, los cuales fueron respondido por 537 consumidores a mediados de abril y mayo del 2020. Se hizo el levantamiento de los datos cualitativos considerando el perfil de cada consumidor, sus costumbres de consumo y su forma de adquisición de las plantas ornamentales. El formulario se elaboró mediante Google Forms y su divulgación se realizó por medio del e-mails y redes sociales, abarcando el mayor número de personas posible. Por medio de la estadística descriptiva, se caracterizó el perfil del consumidor final y se comprobó qué, estas plantas eran adquiridas por el simple hecho de llamar su atención como especie vegetal o para decorar. Existe un favoritismo por plantas en potes, principalmente orquídeas y suculentas, las cuales eran adquiridas en floristerías juzgándose factores de compra cómo: apariencia y precio. La periodicidad de compra de las plantas ornamentales es realizada de forma semestral, juntamente con la alta relación de la calidad de vida de estas personas. El aislamiento social proveniente de la pandemia del Covid-19, provocó cambios en los hábitos de las personas, acarreando una mayor necesidad de tener plantas en las casas y aumentando así, el consumo de las plantas ornamentales y su preferencia por la producción local.

Palabras clave: Floristería, Coronavirus, paisajismo, flores de corte, plantas en potes.

Introduction

The term ornamental species refers to any plants grown for their beauty, which can be used in architecture and landscaping in different environments, adapting to free spaces or decorative containers, and establishing a man-nature relationship (Silva *et al.*, 2014). Ornamental plants are selected based on their visual characteristics, comprising the flowering appearance, presenting colorful, showy flowers and inflorescences, which can even be perfumed; foliage elements such as shape, texture, and color; the stem's shape and texture, or even the shape and general aspect of the plant itself (Silva, 2009). Thus, the aesthetic benefits of these plants are enormous, whether they are used for indoor decoration through arrangements with cut flowers and foliage or potted plants, or for outdoor environments with potted plants and gardens.

Besides aesthetics, ornamental plants have other functions in the domestic and urban environment, thus being considered as elements of public utility. These plants bring countless benefits to people by improving the climatic conditions of the place where they are located, such as increased air humidity, decreased pollution, temperature, in addition to less use of paved areas facilitating

rainwater infiltration, easing flooding problems (Fjeld *et al.*, 1998; Senar, 2017). Therefore, it is increasingly common to value ornamental plants in urban centers, as they give a sense of well-being to the environments (Silva *et al.*, 2014).

Ornamental plants also produce beneficial effects on human health, since their cultivation can be recommended as a form of therapy, positively interfering in the psychological condition of those who practice it (Senar, 2017). These plants have the function of transmitting harmony, a feeling of tranquility, and comfort to the observer, contributing to mental and physical welfare (Silva *et al.*, 2014).

However, due to the new coronavirus (SARS-CoV-2), responsible for the Covid-19 pandemic, the flower and ornamental plants market had a drastic reduction with the adoption of social restriction measures to contain the disease in Brazil and worldwide. According to the Brazilian Confederation of Agriculture and Livestock (CNA), events prohibition, florist, and fairs closings had significant effects on the sector, especially for flowers. Some segments of the chain feel a contraction of up to 90% in weekly sales (Pier, 2020).

Given this scenario, this work is justified by the global, national, and local economic relevance



of the floriculture chain and because of the losses caused so far due to Covid-19. Thus, this study aimed to characterize the ornamental plants' final consumer profile, the habit of consuming ornamental plants, and estimate the initial effect of the Covid-19 pandemic on the acquisition of such plants.

Material and Methods

The research, of exploratory and quantitative nature, was carried out with 537 people, from April 30 to May 26, 2020, at the beginning of the Covid-19 pandemic. The instrument used was a structured questionnaire composed of 21 close-ended questions. The participants' profile characterization included information about sex, age, family income, education, location, and taste or not for ornamental plants.

To survey the habit of consuming ornamental plants, the following questions were asked: the type of plant usually acquired (cut flowers and foliage, garden or potted plants), frequency of the purchase (week, biweekly, monthly, biannual, annual, or on festive dates), the main reason of the purchase (welfare, embellishment, taste for ornamentals, as gifts for others, or replacement/substitutes of other ornamentals), the main plants purchased (orchids, bromeliads, flowers, foliage, bulbs, trees, shrubs, palms, vines, succulents, herbs or grasses), the usual place of purchase (subscriptions, street stalls, street markets, flower shops, gardens, internet, supermarkets/hypermarkets or plant nurseries), the main attribute observed at the time of purchase (visual appearance, pleasant smell, color, packaging, ease of purchase, price or seedling size), and an attempt was made to find out about the origin of the acquired plant. In some of these questions, there was also the option in case the respondent had not the habit of buying ornamental plants.

The characterization of the consumption of ornamental plants during the Covid-19 pandemic was based on questions about the existence or absence of a relationship between quality of life and these plants; change in consumption habits (if participants continue to buy as before the pandemic, if there was an increase or decrease in the purchase, if they're not buying or if they

don't have the habit of doing such thing); the need to have, or have more (if they already had) ornamental plants at home; the preference, starting from the pandemic, for locally produced plants; access to these (is easily found or in small quantities, if their preferred plants are not found, or if this is caused by the commerce closing, if you did not look for them during this period or if it was for fear of leaving home, or if you do not have the habit of buying them). The consumption of plants for gardens, potted plants, leaves, and cut foliage was characterized, investigating whether the acquisitions of these plants decreased, maintained, or increased with the pandemic occurrence.

Once finished, the questionnaire was available on google forms, being disseminated via e-mail and social networks (WhatsApp, Instagram, and Facebook) to as many people as possible, and answered by 537 of them. The obtained data were arranged and analyzed using descriptive statistics, using the Excel Program (Microsoft Excel, 2016).

Results and Discussion

Questionnaires were accepted for responses by 537 people, the majority of whom were female (64.1%), aged between 21 and 40 years (54.4%), and had a college education (86.8%). People over 60 years old correspond to a small percentage of respondents, 6.3% (Figure 1A). In terms of location, 70.4% of these people live in the state of Goiás, followed by São Paulo (9.9%) and the Distrito Federal (9.5%). Goiás already occupies a privileged position in Brazilian floriculture, especially as an important producer of ornamental species for landscaping and gardening (Sebrae, 2015a). São Paulo accounts for the main portion of the activity, with 48,9% of the commercial floriculture, particularly in the municipal poles of Atibaia and Holambra (Junqueira & Peetz, 2017). Furthermore, the Federal District has emerged as a floriculture pole capable of meeting its demand in the future and exporting to supply important portions of the North and Northeast regions, and Midwest states (Sebrae, 2015a), in addition to concentrating the highest per capita consumption of flowers and ornamental plants of the country (Junqueira & Peetz, 2017).

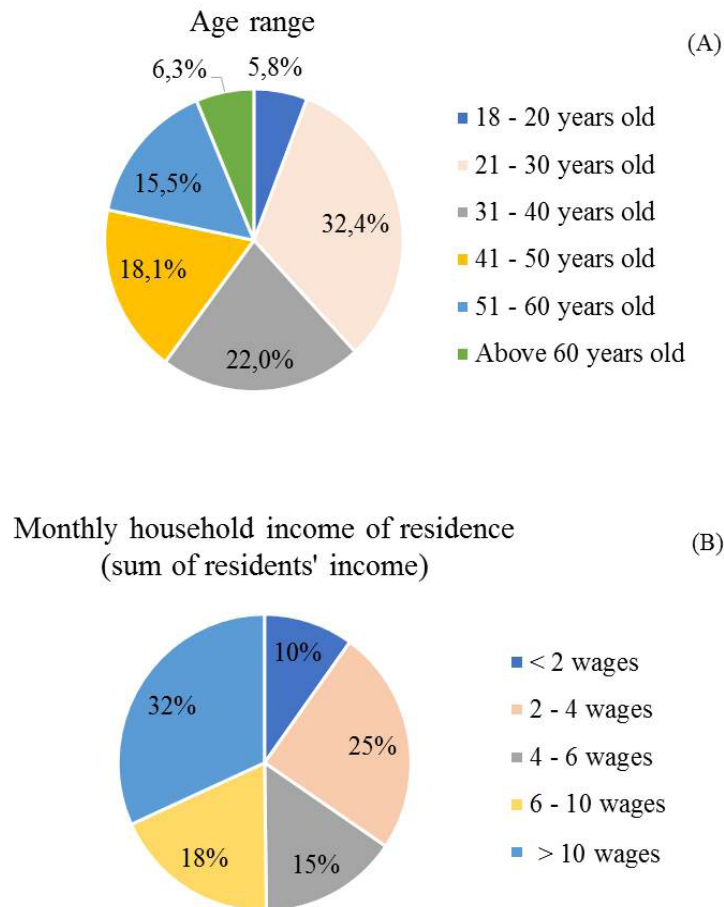


Figure 1 – Consumer's profile characterization in terms of age group (A) and family income (B). (Questionnaire available on google forms from April 30 to May 26, 2020).

The family income of 33.7% and 31.8% of people is between four and ten, and above ten minimum wages (Figure 1B), encompassing social classes C and B/A, respectively, according to the classification from FGV (2014). Income, in addition to the economic situation, social class, and gender, are factors that affect flowers and ornamental plant purchases. Thus, the variation in these criteria has a direct influence on the demand for these products (Neves & Pinto, 2015).

Most respondents (97%) claim to like ornamental plants, acquiring mainly potted plants (48.6%), although the segment of ornamental plants for landscaping and gardening answer for 42% of the total financial movement of the market. Plants in pots have a better cost-benefit ratio, greater durability, practicality and flexibility to move in doors (Aydogan & Cerone, 2020). Besides, they

are more adapted to the contemporary lifestyle, of scarce time, of less stay at home, and smaller rooms (Sebrae, 2015a), compact and functional (Neves & Pinto, 2015).

Garden plants, cut flowers, and leaves were mentioned as the main ones at the time of purchase by 21.7% and 12.1% of respondents, respectively. However, despite liking ornamentals, 17.7% of people don't have the habit of buying them. Plants for landscaping are becoming increasingly important, considered not only as differentials for construction valuation but also as essentials to the quality of urban life today and current consumption culture (Sebrae, 2015a). The demand for these plants has been growing due to the increase in the number of condominiums in both buildings and houses, as well as commercial or residential, becoming an essential niche in the chain (Neves & Pinto, 2015).

When questioned about the main ornamental plants purchased, orchids are the most cited by 59.3% of people, followed by succulents (48.4%) and flowers (46.4%) (Figure 2). According to Junqueira & Peetz (2017), the orchid is the main one among the flowers and potted ornamental plants. The consumption of flowers and ornamental plants around the world is volatile, dependent on fashion cycles, and in constant search for novelties. In Brazil, mainly orchids (Sebrae, 2015a) have

drawn the segment of potted flowers and plants. The tendency in the use of succulents and cacti, existing since 2014, is already being minimized, giving way to the future trend indicated by the use of foliage of intense colors and designs such as monstera, begonias, calatheas and marantas, alocasias and bromeliads, among others, following the current concepts of “Urban Jungle” and “Biophilic Design”.

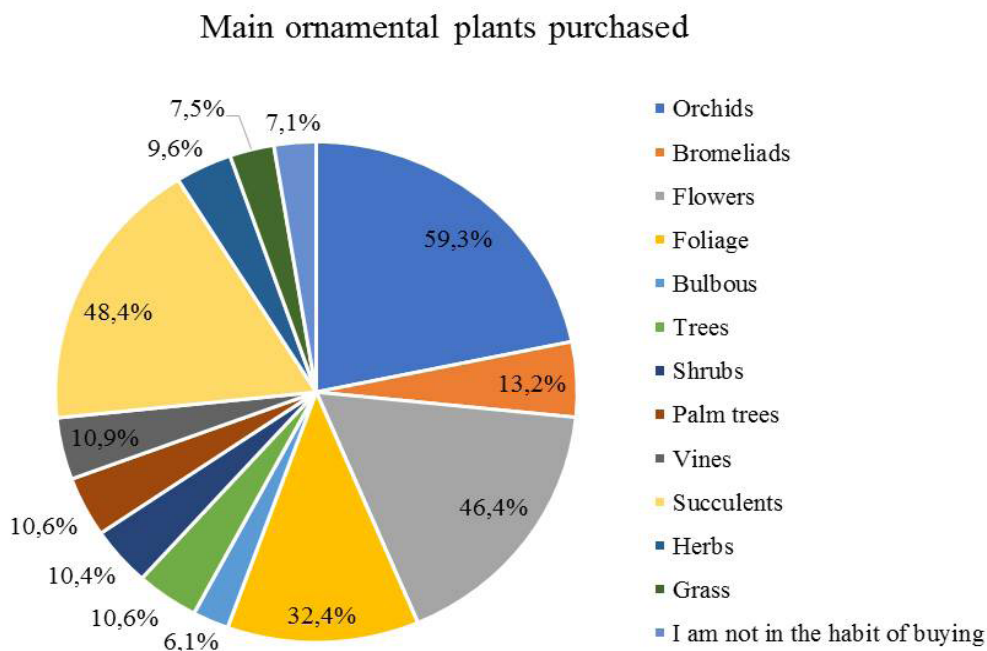


Figure 2 – Ornamental plants consuming habit characterization in terms of the most purchased. (Questionnaire available on google forms from April 30 to May 26, 2020).

The ornamental plant acquisition frequency occurs every six months and monthly by 26.3% and 22.3% of people, respectively. Also, 15% of the respondents buy them only on festive dates, and only 12.9% of them purchase these types of plants once a year. The weekly and biweekly acquisitions, which would also be interesting from an economic point of view, are made in a smaller proportion, by only 4.4% and 4% of people, respectively. In Brazil, flowers and ornamental plants consumption still shows a strongly seasonal behavior, marked by the main national commemorative dates (Sebrae, 2015b; Junqueira & Peetz, 2017), which for the floriculture sector are seven per year. These data indicate the lack of ornamental plants consuming habit in the national daily life, reflecting the low

consumption per capita, which, according to Neves & Pinto (2015), was R\$ 26.68 in 2014. Still, according to the authors, the consumption can be increased, among other factors, not only by offering more products but also by strengthening the perception of the benefits of flowers and ornamental plants by the consumer.

For the flowers and ornamental plants sector, despite the existence of direct sales between the producer and the consumer, or even from the wholesale to the consumer, retail is the most used marketing route by the end-user (Neves & Pinto, 2015). Flower shops (58.7%) are still the main places to buy ornamentals (Figure 3). These are characterized as a specialized environment in the commercialization of this type of plant (Neves &

Pinto, 2015). These establishments have the great advantage of personalized service, offering items based on the conceptual and artistic development

of floral art, packaging differentiation, presentation forms, and monitoring of customer satisfaction, especially after sales (Sebrae, 2015b).

Usual place of purchase of ornamental plants

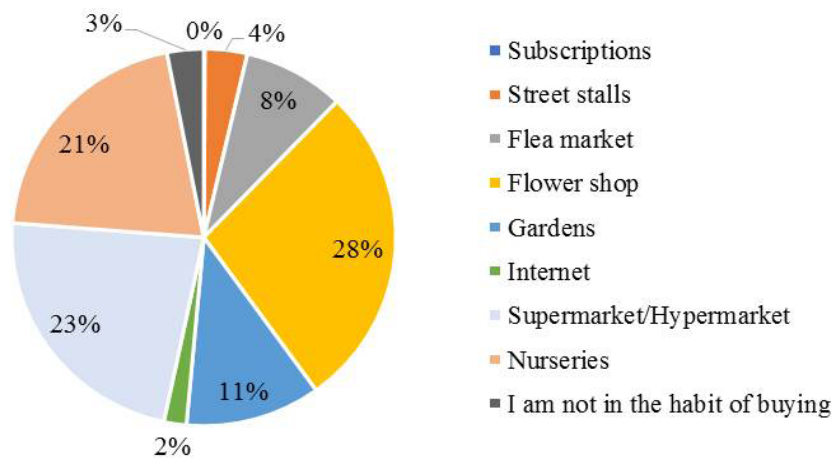


Figure 3 – Ornamental plants consuming habit characterization in terms of the place of purchase. (Questionnaire available on google forms from April 30 to May 26, 2020).

However, supermarkets/hypermarkets and nurseries represent a significant portion, since 48.2% and 43.6% of people, respectively, also acquire them in these spaces. This channel has become a center of convenience and solutions for consumers, in addition to stimulating consumption in the production chain via practicality (Neves & Pinto, 2015), contributing to the increase in own consumption aimed at home and work. According to Sebrae (2015b), supermarkets and garden centers provide self-service and offer large volumes at competitive prices. In addition to the greater availability of income for the population, according to Hummel & Miguel (2017), the new channels used in marketing (supermarkets and online sales) have contributed to the increase in flower consumption in Brazil due to the product's quality, availability and ease purchase.

Although the electronic sale of ornamental plants allows the supply to the customer, a wide range of products and services, faster transactions and large-scale quality service (Sebrae, 2015b), purchase through the internet (4%) and, especially from subscriptions (0.2%), still have little influence in this sector.

At the time of purchase, visual appearance is the most observed attribute for most people (63.9%), followed by price (15.9%) (Figure 4). Other aspects also mentioned as important, but to a lesser extent, were the size of the seedling, the color, the ease of purchase, the presence of a pleasant smell, and, finally, the packaging. The visual effects that ornamental plants can produce are associated with the plants types and the particular attributes of each one (Lorenzi & Souza, 2008).



Main attribute observed when purchasing the ornamental plant

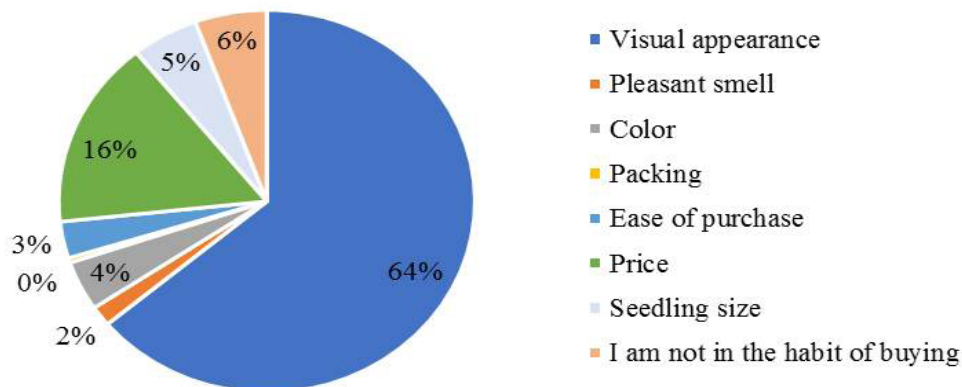
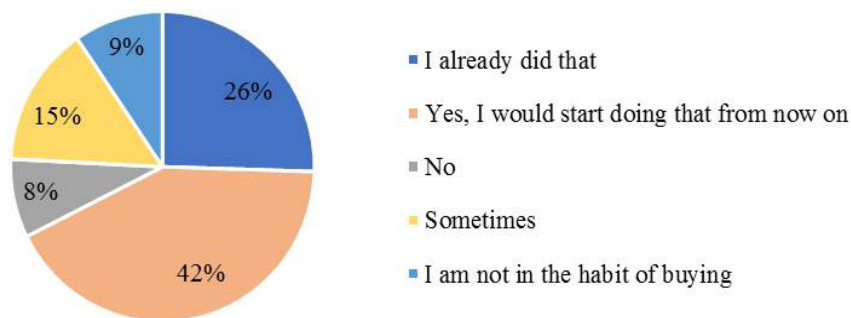


Figure 4 – Ornamental plants consuming habit characterization in terms of the attribute observed when acquiring the ornamental plant. (Questionnaire available on google forms from April 30 to May 26, 2020).

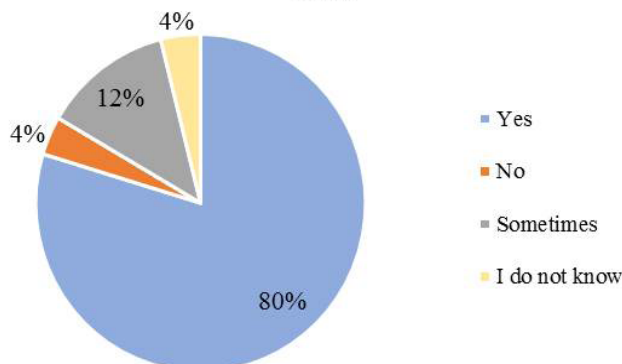
Among people who like ornamental plants, almost half of them (49.9%) did not seek to know about the origin at the time of purchase. However, as a result of social isolation, the pandemic may have brought about a change in the habits and

routines of families. 42.2% of respondents, regardless of whether or not they like these plants, said that they will give preference to local production from now on (Figure 5A).

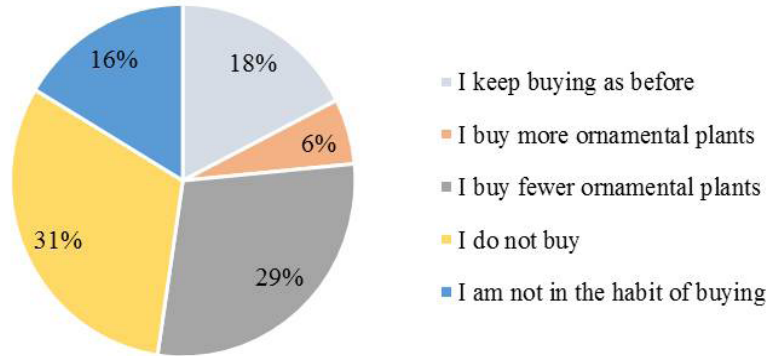
Would you give preference to ornamental plants produced locally from the pandemic? (A)



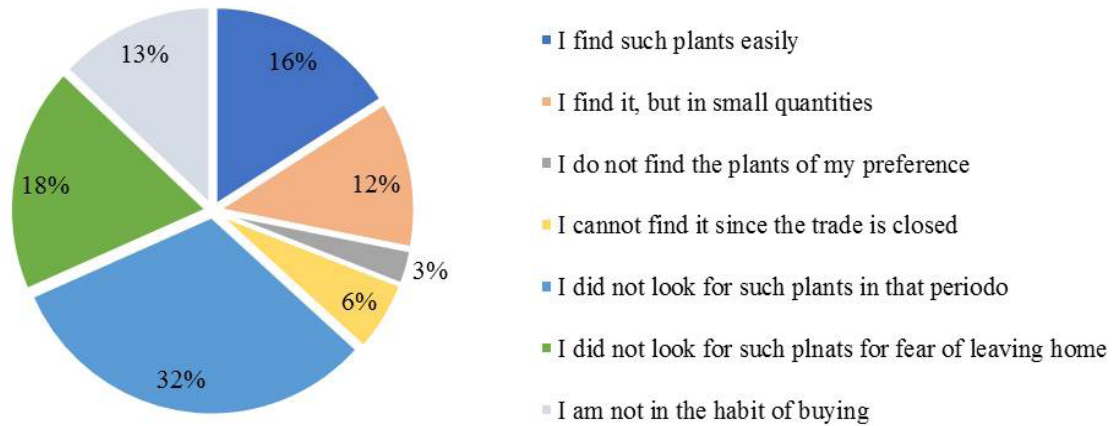
Do you believe that the ornamental plant is related to people's quality of life? (B)



With the pandemic, did you change your habit in relation to ornamental plants? (C)



With regard to access to ornamental plants during the pandemic, which alternative is best applied: (D)



In this pandemic moment, did you feel the need to have, or have more (if you already have) ornamental plants at home? (E)

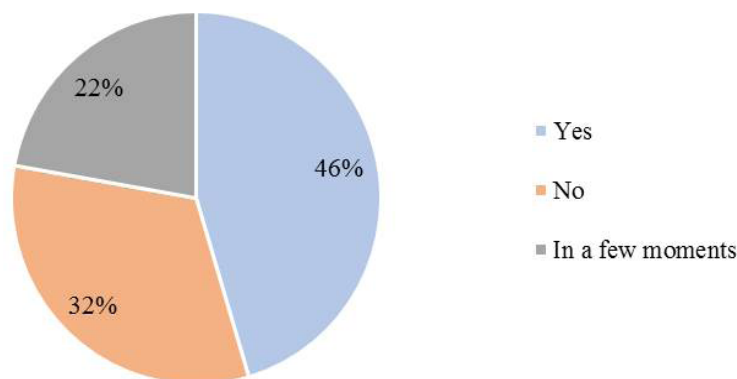


Figure 5 – Ornamental plants acquisition characterization during the Covid-19 pandemic concerning: preference for locally produced plants (A), plant relationship and quality of life (B), changes in consumption habits (C), ease of the plant acquisition at that time (D), need for greater consumption (E). (Questionnaire available on google forms from April 30 to May 26, 2020).



Quality of life is related to ornamental plants for 79.7% of respondents (Figure 5B), probably because it is connected to emotions. Urban green spaces and the benefits of man's contact with them are cited as improvement points in the quality of society life (Carrus *et al.*, 2015). Among the people who responded that they like ornamental plants (521 people), 29.2% have the taste as a motivating factor for the purchase; next are beautification and well-being for 21.3% and 20.9% of people, respectively. The acquisition aimed at gifting third parties is the main reason for 19% of them, and for 9.6%, the main objective is to replace/substitute other plants.

The consumption of ornamental plants was lower in the Covid-19 pandemic for 28.9% of people (Figure 5C), which may be related to the uncertainties of the initial moments of the disease in the country, since 18.6% of these people did not seek plants due to fear of leaving home (Figure 5D). According to Anacleto *et al.* (2021), the most significant economic impact on flowers shops was the drop in the number of customers.

At the beginning of the pandemic in Brazil, starting in the second half of March, social restriction measures to contain Covid-19 were established, including events cancellation, social isolation and distancing, and the closing of establishments considered "non-essential", including flower shops and fairs. And, with the suspension of celebratory and funeral activities where flowers are very used, the flower production and trade sector was one of the most affected in Brazil during the pandemic (Guarizzo, 2020). As a result, there was a drastic reduction in the floriculture sector, reaching up to 90% of weekly revenue in some of its segments (Pier, 2020). However, even in the face of such a situation, 17.5% of people said they continued to buy ornamental plants as they did before the pandemic, and for 6% of them, there was even an increase in consumption. According to ACTOEP (2020), the implementation and maintenance of gardens and the plants pots cultivation are included in the guide "Practical guidelines for healthy routines" of the Cultural Association of Occupational Therapists of the State of Paraná (ACTOEP) as suggestions for activities for the pandemic period, so that people feel more productive and as a way to bring more harmony to the homes.

This new scenario generated a need to have, or have more (if you already had) ornamental plants at home for almost half of the respondents (45.4%), which was also felt at times by 22.2% of them (Figure 5E). According to Anacleto *et al.* (2020), the pandemic changed profoundly the flowers trade, inserting the flower delivery directly to the customers' house, specially designed for own use. In terms of access, 31.7% of people say they did not look for these plants during this pandemic period (Figure 5D). In contrast, 16% of respondents said they found them easily, which may be related to the continued functioning supermarkets/hypermarkets functioning. Nevertheless, as flower shops and nurseries were initially closed, 12.1% of people said that the quantities were reduced, or even that they did not find them due to the closing of trade (5.8%), or did not find the plants of their preference/taste (2.8%).

There was an increase of 3%, 2.4%, and 1.1% in the purchase of plants for gardens, potted plants, and cut flowers and foliage, respectively. Probably, with the social distance and the closing of the trade, many people started to work and stay longer in their homes, increasing the need for more contact with vegetation. This data may reflect trends in changing consumer habits from now on. It is also necessary to consider the reopening of establishments after the intersection of the sector with the Ministry of Agriculture, Livestock and Supply (MAPA), due to the appeal for Mother's Day, considered as "Christmas" of the sector, when it was observed signs of recovery in the area, whose sales in this period were positive. For this, there was also the promotion of actions on social media through campaigns, such as "Take care of those who care so much" (Cooperflora, 2020), "On this Mother's Day show all your love with flowers" (Ibraflor, 2020) and "On this Mother's Day embrace with flowers" (Veiling Holambra, 2020), aiming to elucidate the benefits provided by the ornamental plant, such as reducing stress, stimulating creativity, and improving people's well-being. All these aspects may have resulted in increased consumption of ornamental plants.

Conclusions

Ornamental plants are acquired simply due to most people like this type of plant and for beautification. There is a preference for potted

plants, mainly orchids, and succulents, acquired especially in flower shops, considering the visual appearance and price as purchasing attributes.

The frequency of purchases of ornamental plants is low, especially every six months, despite their high relationship with people's quality of life.

The Covid-19 pandemic initially affected the consumption of ornamental plants and caused changes in habits, involving the greater need to have plants at home, giving preference to local production since then.

References

- ACTOEP (Associação Cultural dos Terapeutas Ocupacionais do Estado do Paraná). 2020. Orientações práticas para rotinas saudáveis: aprendendo a lidar com as mudanças de rotina devido ao Covid-19. <https://2e50ceefdb66-47c3-9bbc-00044d447c12.filesusr.com/ugd/865ed2_ef701318dec5456b8159f07e646c59b3.pdf>. Acesso em: 08/10/2021.
- Anacleto A & Bornancin APA. Between flowers and fears: the new coronavirus pandemic (COVID-19) and the flower retail trade. *Ornamental Horticulture*, 27(1): 26-32, 2021. DOI: <https://doi.org/10.1590/2447-536X.v27i1.2232>. Acesso em: 11/10/2021.
- Aydogan A & Cerone R. 2020. Review of the effects of plants on indoor environments. *Indoor and Built Environment*, Online First. DOI: <https://doi.org/10.1177/1420326X19900213>. Acesso em: 11/10/2021.
- Cais C. Prejuízos no campo com a pandemia. *Diário da Região*. São José do Rio Preto, 18 abr. 2020. <<https://www.diariodaregiao.com.br/economia/2020/04/1191362-prejuizos-no-campo-com-a-pandemia.html>>. Acesso em: 22/04/2020.
- Carrus G *et al.* Go greener, feel better? The positive effects of biodiversity on the well-being of individuals visiting urban and peri-urban green areas. *Landscape and Urban Planning*, 134, 221-228, 2015. DOI: <https://doi.org/10.1016/j.landurbplan.2014.10.022>. Acesso em: 08/10/2021.
- COOPERFLORA (Cooperativa dos Floricultores). Cuidar de quem tanto cuida. *Holambra*, 24 abr. 2020. Instagram: @cooperflora. <https://www.instagram.com/p/B_X0awlHjMC/>. Acesso em: 08/10/2020.
- FGV (Fundação Getúlio Vargas). 2014. Centro de Políticas Sociais. Rio de Janeiro. <<https://cps.fgv.br/qual-faixa-de-renda-familiar-das-classes>>. Acesso em: 22/06/2020.
- Fjeld T, Veiersted B, Sandvik L, Riise G & Levy F. The effect of indoor foliage plants on health and discomfort symptoms among office workers. *Indoor and Built Environment*, 7(4): 204-209, 1998. DOI: <https://doi.org/10.1159/000024583>. Acesso em: 11/10/2021.
- Guarizzo M. 2020. Mercado de flores amarga prejuízo milionário. CBN. <<https://portalcbnb Campinas.com.br/2020/04/com-prejuizo-milionario-mercado-deflores-pede-mudancas-ao-governo>>. Acesso em: 12/10/2021.
- Hummel M & Miguel LAP. Gerando valor na cadeia de flores de corte no mercado brasileiro. *Práticas em Contabilidade e Gestão*, 5(1): 176-191, 2017. DOI: <<http://dx.doi.org/10.5935/2319-0485/praticas.v5n1p176-191>>. Acesso em: 08/10/2021.
- IBGE (Instituto Brasileiro de Geografia e Estatística). 2011. Indicadores sociais municipais. Uma análise dos resultados do universo do Censo Demográfico 2010. Rio de Janeiro: Estudos e Pesquisas Informação Demográfica e Socioeconômica, n. 28. <<https://biblioteca.ibge.gov.br/visualizacao/livros/liv54598.pdf>>. Acesso em: 15/07/2020.
- Ibraflor (Instituto Brasileiro de Floricultura). Dia das mães. *Holambra*, 03 maio 2020. Instagram: @ibraflor. <https://www.instagram.com/p/B_vUjh5H0ws/?utm_medium=copy_link>. Acesso em: 08/10/2020.
- Junqueira AH & Peetz MS. Brazilian consumption of flowers and ornamental plants: habits, practices and trends. *Ornamental Horticulture*, 23(2): 178-184, 2017. DOI: <<https://doi.org/10.14295/oh.v23i2.1070>>. Acesso em: 11/10/2020.
- Lorenzi H & Souza HM. Plantas ornamentais do Brasil: arbustivas, herbáceas e trepadeiras, 4 ed. Nova Odessa: Plantarum, 2008. 558p.
- MICROSOFT Excel (2016). Versão 2102. [S. l.]: Microsoft Corporation, 2016. 1 CD.
- Neves MF & Pinto MJA (Coord.). 2015. Mapeamento e quantificação da cadeia de flores e plantas ornamentais do Brasil. São Paulo: OCESP. 122p. <<https://app.fearp.usp.br/documentos/arquivos/imprensa/8078/8078.pdf>>. Acesso em: 07/07/2020.
- Sebrae (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas). 2015a. Flores e plantas ornamentais do Brasil. v. 1. Série Estudos Mercadológicos. 44p. <http://www.hortica.com.br/artigos/2015/FPO_BR_Estudos_Mercadologicos_2015_Vol1.pdf>. Acesso em: 07/07/2020.
- Sebrae (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas). 2015b. Flores e plantas ornamentais do Brasil. v. 3. Série Estudos Mercadológicos. 25p.



<http://www.hortica.com.br/artigos/2015/FPO_BR_Estudos_Mercadologicos_2015_Vol3.pdf>. Acesso em: 07/07/2020.

Senar (Serviço Nacional de Aprendizagem Rural). 2017. Plantas ornamentais: jardinagem. Brasília: SENAR. 84p.

Silva EIS, Santos JO & Conceição GM. Diversidade de plantas ornamentais no centro de estudos superiores de Caxias, da Universidade Estadual do Maranhão. Enciclopédia Biosfera, 10(18): 3237-3249, 2014.

Silva LC. Plantas ornamentais tóxicas presentes no shopping Riverside Walk em Teresina-PI. Revista da Sociedade Brasileira de Arborização Urbana, 4(3): 64-85, 2009.

Veiling Holambra. Neste dia das mães abrace com flores. Holambra, 10 maio 2020. Instagram: @veilingholambra. <https://www.instagram.com/p/CABKCCyJ5yd/?utm_medium=copy_link>. Acesso em: 08/10/2020.

Biodiversidade Brasileira – BioBrasil.

Fluxo Contínuo

n. 2, 2022

<http://www.icmbio.gov.br/revistaeletronica/index.php/BioBR>

Biodiversidade Brasileira é uma publicação eletrônica científica do Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) que tem como objetivo fomentar a discussão e a disseminação de experiências em conservação e manejo, com foco em unidades de conservação e espécies ameaçadas.

ISSN: 2236-2886