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COVID-19 and the importance of urban green spaces

On the 11th of March 2020, the World Health Organization (WHO) declared that the novel coronavirus SARS-CoV-2 (COVID-19) outbreak was a global pandemic. At a news briefing, WHO Director-General, Dr. Tedros Adhanom Ghebreyesus, said that the WHO is "deeply concerned both by the alarming levels of spread and severity and by the alarming levels of inaction" and he called on countries to act immediately to contain the virus (Cucinotta and Vanelli, 2020). In response Governments around the world introduced a variety of non-pharmaceutical interventions to mitigate the spread of SARS-CoV-2 in part to protect their health services from being overwhelmed. The range of measures was extensive and included travel restrictions, social distancing and personal protective measures (Haug et al., 2020). Many countries instituted 'stay at home policies' allowing limited time for outdoor exercise and in some cases the use of green spaces was either prohibited, very localised or severely limited.

As was widely reported in the media during the 'first wave' of COVID-19 infections (March–July 2020), an important role was played by urban green spaces (UGS) to alleviate the human wellbeing consequences of 'lockdown policies' notably that of social isolation and mental health. It was in this context that a call for papers was issued for a special issue of *Urban Forestry & Urban Greening* as it was certain that researchers would be strongly motivated to conduct investigations of the initial and subsequent impacts of the pandemic cutting across several fields. Hence, they needed a platform to share their research results. These results would not only be timely, but it would also provide future learning in terms of societal resilience and the contributions green spaces can make. The call for papers was left deliberately wide in its focus to encourage a diverse range of contributions that would include international and local perspectives as well as different research fields. As it turned out the contributions also embrace the different waves of the SARS-CoV-2 pandemic. A total of 18 research articles and one short communication were accepted for the special issue.

One of the first contributions on the use and perception of UGS during the pandemic was provided by Ugolini et al. (2020) which investigated at a European level and in the context of different social isolation regimes the twin needs to redesign the urban fabric and increase the presence and access to UGS close to residences. Their principal results show that urban residents normally have a need for accessible urban green space for physical exercise, relaxation and observing nature. Behavioural change was observed especially in respect of an increased need for the proximity to green spaces. The perception of natural spaces in urban areas was also taken into consideration, again on a European scale, by Garrido-Cumbrera et al. (2021) which noted a beneficial role of UGS especially in the context of a greater limitation on individual freedoms.

The perception and use of UGS during the first wave of the pandemic was evaluated by Lopez et al. (2021) in New York City and how the role of greenery was different in terms of gender and ethnicity. An important finding was that people who took part in a survey were especially concerned about the lack of social distancing and overcrowding in urban green spaces and were hence less likely to visit than before the pandemic. Also in New York, Pipitone and Jovic (2021) studied how the sense of belonging to UGS is linked to socio-demographic differences and to the economic level of people. Their findings support that of Lopez et al. namely an observed increase in use of urban green spaces and that equity issues were evident with white participants and those living in middle upper income areas reporting higher usage of UGS. Also in the US, Liu and Wang (2021), citing Honey-Rosés et al. (2020) state that the COVID-19 crisis has focused attention on various aspects of planning a healthier city unlike anything seen in a generation. Liu and Wang believe that pocket parks could be effective in increasing accessibility to all urban populations but that efforts are equally needed to ensure they avoid separating park users whilst also adding more variety to urban green space. In Latin America, Sainz-Santamaria and Martinez-Cruz (2022) analysed adaptive governance based on responses from UGS managers in the wider context of public health and environmental justice. Their findings reveal on the one hand that dedicated management governance has been able to learn through the piloting of ideas but that municipal management has found it difficult to adapt due to a variety of factors ranging from insufficient community involvement to lack of autonomy.

In a large sample study in Belgium, Da Schio et al. (2021) studied the use and attitudes towards urban forests and UGS highlighting how not only age, gender, but also the level of education is playing a role during the pandemic. Drastic changes in people's routines and daily mobility were found in the Belgian study alongside important findings in respect of civil engagement. In Turkey, Erdonmez and Atmis (2021), found that people generally did not support the pandemic restriction measures including the closing of the coasts and urban green space for use. Indeed, based on the opinions of the Turkish survey the pandemic has caused more psychological problems than physical problems and that access to urban green spaces is very important in aiding the elimination of some of the negative effects of pandemic conditions.

The role of UGS as an element of well-being was also highlighted in China by Zhu and Xu (2021) who used a social platform to analyse feelings outside and inside urban parks in Beijing. They found that during the height of the pandemic visitors to a Beijing Park generated more positive microblogs inside than outside the park and that landscape and plants were the main elements of positive emotions. Yang et al. (2021) highlighted the positive impact of urban green spaces on

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public health. Included in their results they found that people living in greener neighbourhoods experienced a lesser degree of reduction in their physical activity level than those who lived in less green neighbourhoods. This raises an interesting discussion around green equity during pandemic conditions. [Ye and Qiu \(2021\)](#), adopted a landscape ecology approach in their study in the Wuhan district, investigating the positive role of landscape metrics on the spread of the contagion, highlighting once again the importance of the presence of open spaces and green in improving the quality of life. This led them to offer a framework which they propose will help to understand and evaluate infection risk. [Yang et al. \(2021\)](#) conducted research in Hong Kong on how urban greenery can compensate for the decrease in leisure time and physical activity during a pandemic finding positive results and also that the duration of the study that physical activity increased in country parks especially by those who live in greener neighbourhoods.

The theme of mental health and stress was a major theme to emerge from the papers with contributions from Singapore, China and Spain. [Sia et al. \(2022\)](#) undertook a survey of $n = 8786$ in the gardening with the edibles programme to measure participants mental resilience status. They found that the mental resilience of those who gardened was statistically significantly higher than an online community and that those with less than one hour of weekly gardening time had significantly lower scores in their total mental resilience. In China a national study was undertaken by [Yao et al. \(2022\)](#) to investigate how parkland mitigated the mental health burden imposed by COVID-19. They identified four key findings one of which was that the provision of parkland is positively associated with mental well-being during the COVID-19 and another that in China parkland buffers the association between the COVID-19 epidemic and mental well-being. A spatial statistical analysis of the relationship between self-reported mental health and the closeness to green infrastructure was undertaken by [Jato-Espino et al. \(2022\)](#) with Las Palma in the Canary Islands and Zaragoza in Spain used as case studies. The authors note some limits to their findings but found evidence that variables such as stress, anger, medication use, alcohol consumption or visits to the doctor significantly decreased if citizens were close to green infrastructure.

In Spain, [Maury-Mora et al. \(2022\)](#) developed an online survey to compare the pre-COVID-19 relationship between people and urban green spaces with the new bond that may have emerged during the pandemic period. They found that indoor plant interaction is not a substitute for different outdoor green experiences, that those who interacted with green spaces in a daily manner managed stress levels better than people who didn't and that turning to green spaces for comfort during stressful times when you don't usually do so helps overcome difficult situations. Although not a parallel research study to that by [Maury-Mora et al. \(2022\)](#), [Pérez-Urrestarazu et al. \(2021\)](#) evaluated the role of having plants at home during the confinement period. In their case they found that for most of the participants indoor vegetation positively influenced emotional well-being during the confinement period albeit this was for a relatively low levels of plants and was generally accompanied by activities in outdoor spaces such as balconies and more time spent on plant nurturing. [Spano et al. \(2021\)](#) using regression models on a sample of $n = 3886$ revealed that the presence of home pot plants as well as a greater amount of green view and access to private green spaces had positive psychological benefits. [Theodorou et al. \(2021\)](#) identified that gardening during the home confinement of the first lockdown was associated with a lower level of psychological stress, based on an online survey administered to 303 participants in Italy.

In a short communication, [Hasse \(2021\)](#) authored a 'COVID-19 reflection' on the topic of urban forestry in European cities under climate change introducing nature-society-based solutions. A triad of approaches emerge from this reflective piece that might lead to novel views of urban nature regarding changes in pandemic diseases and/or relationships to urbanisation and climate change. The keywords to emerge are hybridity, succession, and flexibility. Ultimately however

nature is our real partner as has been demonstrated time and again through all the papers in this special issue.

The Editors writing from Europe might hope that SARS-CoV-2 pandemic is a once in a lifetime event, but for global citizens COVID-19 is but one more public health crisis that has interrupted their lives. Studies from various cities across the globe reported in this special issue of Urban Forestry & Urban Greening on the COVID-19 pandemic confirm that nature in its various forms (from potted single plant to urban forests) are important for our psychological, physiological and social well-being as *Homo sapiens*. The studies presented here also support the protective function that green spaces brings against the spread of the SARS-CoV-2 virus ([Klomp maker et al., 2021](#)). During challenging times, it is also evident, in the urban context, that available and accessible green spaces is not a luxury but a necessary component of our shared living spaces. Whilst it is challenging to ensure sufficient provision of urban green spaces for all citizens in increasingly densified cities, based on the accumulating evidence not least that provided in this special issue, the message to those who make public policy is clear - green spaces in their many forms; gardens, parks, urban forests and green infrastructures are not a human luxury but a human necessity.

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