Supplement

List of 159 peer-reviewed literature after data quality control:

Agathokleous, E., Saitanis, C. J., Stamatelopoulos, D., Mouzaki-Paxinou, A.-C., Paoletti, E., and Manning, W. J.: Olive oil for dressing plant leaves so as to avoid O3 injury, Water Air Soil Poll, 227, 10.1007/s11270-016-2986-9, 2016.

Akhtar, N., Yamaguchi, M., Inada, H., Hoshino, D., Kondo, T., and Izuta, T.: Effects of ozone on growth, yield and leaf gas exchange rates of two Bangladeshi cultivars of wheat (Triticum aestivum L.), Environ Pollut, 158, 1763-1767, 10.1016/j.envpol.2009.11.011, 2010.

Akhtar, N., Yamaguchi, M., Inada, H., Hoshino, D., Kondo, T., Fukami, M., Funada, R., and Izuta, T.: Effects of ozone on growth, yield and leaf gas exchange rates of four Bangladeshi cultivars of rice (Oryza sativa L.), Environ Pollut, 158, 2970-2976, 10.1016/j.envpol.2010.05.026, 2010.

Anderson, P. D., Houpis, J. L., Helms, J. A., and Momen, B.: Seasonal variation of gas exchange and pigmentation in branches of three grafted clones of mature ponderosa pine exposed to ozone and acid rain, Environ Pollut, 97, 253-263, 10.1016/s0269-7491(97)00093-6, 1997.

Ashrafuzzaman, M., Lubna, F. A., Holtkamp, F., Manning, W. J., Kraska, T., and Frei, M.: Diagnosing ozone stress and differential tolerance in rice (Oryza sativa L.) with ethylenediurea (EDU), Environ Pollut, 230, 339-350, 10.1016/j.envpol.2017.06.055, 2017.

Bagard, M., Jolivet, Y., Hasenfratz-Sauder, M. P., Gerard, J., Dizengremel, P., and Le Thiec, D.: Ozone exposure and flux-based response functions for photosynthetic traits in wheat, maize and poplar, Environ Pollut, 206, 411-420, 10.1016/j.envpol.2015.07.046, 2015.

Barnes, J. D. and Pfirrmann, T.: The influence of CO2 and O3 , singly and in combination, on gas exchange, growth and nutrient status of radish (Raphanus sativus L.), The New phytologist, 121, 403-412, 10.1111/j.1469-8137.1992.tb02940.x, 1992.

Beyers, J. L., Riechers, G. H., and Temple, P. J.: Effects of long-term ozone exposure and drought on the photosynthetic capacity of ponderosa pine (Pinus ponderosa Laws.), The New phytologist, 122, 81-90, 10.1111/j.1469-8137.1992.tb00055.x, 1992.

Biswas, D. K., Xu, H., Li, Y. G., Ma, B. L., and Jiang, G. M.: Modification of photosynthesis and growth responses to elevated CO2 by ozone in two cultivars of winter wheat with different years of release, J Exp Bot, 64, 1485-1496, 10.1093/jxb/ert005, 2013.

Biswas, D. K., Xu, H., Li, Y. G., Sun, J. Z., Wang, X. Z., Han, X. G., and Jiang, G. M.: Genotypic differences in leaf biochemical, physiological and growth responses to ozone in 20 winter wheat cultivars released over the past 60 years, Global Change Biol., 14, 46-59, https://doi.org/10.1111/j.1365-2486.2007.01477.x, 2008.

Blumenrother, M. C., Low, M., Matyssek, R., and Osswald, W.: Flux-based response of sucrose and starch in leaves of adult beech trees (Fagus sylvatica L.) under chronic free-air O3 fumigation, Plant Biology, 9, 207-214, 10.1055/s-2006-924565, 2007.

Booker, F. L., Burkey, K. O., Pursley, W. A., and Heagle, A. S.: Elevated carbon dioxide and ozone effects on peanut: I. Gas-exchange, biomass, and leaf chemistry, Crop Sci, 47, 1475-1487, 10.2135/cropsci2006.08.0537, 2007.

Booker, F. L., Miller, J. E., Fiscus, E. L., Pursley, W. A., and Stefanski, L. A.: Comparative responses of container-versus ground-grown soybean to elevated carbon dioxide and ozone, Crop Sci, 45, 883-895, 10.2135/cropsci2004.0198, 2005.

Bortier, K., Vandermeiren, K., De Temmerman, L., and Ceulemans, R.: Growth, photosynthesis and ozone uptake of young beech (Fagus sylvatica L.) in response to different ozone exposures, Trees, 15, 75-82, 10.1007/s004680000076, 2001.

Burkart, S., Bender, J., Tarkotta, B., Faust, S., Castagna, A., Ranieri, A., and Weigel, H. J.: Effects of ozone on leaf senescence, photochemical efficiency and grain yield in two winter wheat cultivars, J Agron Crop Sci, 199, 275-285, https://doi.org/10.1111/jac.12013, 2013.

Cardoso-Vilhena, J. and Barnes, J.: Does nitrogen supply affect the response of wheat (Triticum aestivum cv. Hanno) to the combination of elevated CO2 and O3?, J Exp Bot, 52, 1901-1911, 10.1093/jexbot/52.362.1901, 2001.

Cardoso-Vilhena, J., Balaguer, L., Eamus, D., Ollerenshaw, J., and Barnes, J.: Mechanisms underlying the amelioration of O3-induced damage by elevated atmospheric concentrations of CO2, J Exp Bot, 55, 771-781, 10.1093/jxb/erh080, 2004.

Castagna, A., Di Baccio, D., Ranieri, A. M., Sebastiani, L., and Tognetti, R.: Effects of combined ozone and cadmium stresses on leaf traits in two poplar clones, Environ Sci Pollut Res Int, 22, 2064-2075, 10.1007/s11356-014-3481-8, 2015.

Castagna, A., Di Baccio, D., Tognetti, R., Ranieri, A., and Sebastiani, L.: Differential ozone sensitivity interferes with cadmium stress in poplar clones, Biol Plantarum, 57, 313-324, 10.1007/s10535-012-0274-0, 2013.

Chaudhary, N., Bonfil, D. J., and Tas, E.: Physiological and yield responses of spring wheat cultivars under realistic and acute levels of ozone, Atmosphere, 12, 10.3390/atmos12111392, 2021.

Chen, C. P., Frei, M., and Wissuwa, M.: The OzT8 locus in rice protects leaf carbon assimilation rate and photosynthetic capacity under ozone stress, Plant Cell Environ, 34, 1141-1149, 10.1111/j.1365-3040.2011.02312.x, 2011.

Cocozza, C., Paoletti, E., Mrak, T., Zavadlav, S., Levanič, T., Kraigher, H., Giovannelli, A., and Hoshika, Y.: Isotopic and water relation responses to ozone and water stress in seedlings of three oak species with different adaptation strategies, 10.3390/f11080864, 2020.

Contran, N. and Paoletti, E.: Visible foliar injury and physiological responses to ozone in Italian provenances of Fraxinus excelsior and F. ornus, Scientific World Journal, 7 Suppl 1, 90-97, 10.1100/tsw.2007.10, 2007.

De Bock, M., Ceulemans, R., Horemans, N., Guisez, Y., and Vandermeiren, K.: Photosynthesis and crop growth of spring oilseed rape and broccoli under elevated tropospheric ozone, Environ Exp Bot, 82, 28-36, 10.1016/j.envexpbot.2012.03.008, 2012.

Dhevagi, P., Ramya, A., Poornima, R., and Priyatharshini, S.: Response of blackgram cultivars to elevated tropospheric ozone, Madras Agricultural Journal, 108, 10.29321/maj.10.000562, 2021.

Donnelly, A., Craigon, J., Black, C. R., Colls, J. J., and Landon, G.: Does elevated CO_2 ameliorate the impact of O_3 on chlorophyll content and photosynthesis in potato (Solanum tuberosum)?, Physiologia Plantarum, 111, 501-511, 10.1034/j.1399-3054.2001.1110410.x, 2001.

Dumont, J., Cohen, D., Gerard, J., Jolivet, Y., Dizengremel, P., and D, L. E. T.: Distinct responses to ozone of abaxial and adaxial stomata in three Euramerican poplar genotypes, Plant Cell Environ, 37, 2064-2076, 10.1111/pce.12293, 2014.

Dumont, J., Spicher, F., Montpied, P., Dizengremel, P., Jolivet, Y., and Le Thiec, D.: Effects of ozone on stomatal responses to environmental parameters (blue light, red light, CO_2 and vapour pressure deficit) in three Populus deltoides × Populus nigra genotypes, Environ Pollut, 173, 85-96, https://doi.org/10.1016/j.envpol.2012.09.026, 2013.

Dusart, N., Gérard, J., Le Thiec, D., Collignon, C., Jolivet, Y., and Vaultier, M.-N.: Integrated analysis of the detoxification responses of two Euramerican poplar genotypes exposed to ozone and water deficit: Focus on the ascorbate-glutathione cycle, Sci Total Environ, 651, 2365-2379, https://doi.org/10.1016/j.scitotenv.2018.09.367, 2019.

Dusart, N., Vaultier, M.-N., Olry, J.-C., Buré, C., Gérard, J., Jolivet, Y., and Le Thiec, D.: Altered stomatal dynamics of two Euramerican poplar genotypes submitted to successive ozone exposure and water deficit, Environ Pollut, 252, 1687-1697, https://doi.org/10.1016/j.envpol.2019.06.110, 2019.

Elvira, S., Alonso, R., Inclán, R., Bermejo, V., Castillo, F. J., and Gimeno, B. S.: Ozone effects on Aleppo pine seedlings (Pinus halepensis Mill.) grown in open-top chambers, Water Air Soil Poll, 85, 1387-1392, https://doi.org/10.1007/BF00477175, 1995.

Fares, S., Oksanen, E., Lännenpää, M., Julkunen-Tiitto, R., and Loreto, F.: Volatile emissions and phenolic compound concentrations along a vertical profile of Populus nigra leaves exposed to realistic ozone concentrations, Photosynth Res, 104, 61-74, 10.1007/s11120-010-9549-5, 2010.

Feng, Z., Calatayud, V., Zhu, J., and Kobayashi, K.: Ozone exposure- and flux-based response relationships with photosynthesis of winter wheat under fully open air condition, Sci Total Environ, 619-620, 1538-1544, 10.1016/j.scitotenv.2017.10.089, 2018.

Feng, Z., Pang, J., Kobayashi, K., Zhu, J., and Ort, D. R.: Differential responses in two varieties of winter wheat to elevated ozone concentration under fully open-air field conditions, Global Change Biol., 17, 580-591, 10.1111/j.1365-2486.2010.02184.x, 2011.

Feng, Y., Nguyen, T. H., Alam, M. S., Emberson, L., Gaiser, T., Ewert, F., and Frei, M.: Identifying and modelling key physiological traits that confer tolerance or sensitivity to ozone in winter wheat, Environ Pollut, 304, 119251, 10.1016/j.envpol.2022.119251, 2022.

Fernandez-Bayon, J. M., Barnes, J. D., Ollerenshaw, J. H., and Davison, A. W.: Physiological effects of ozone on cultivars of watermelon (Citrullus lanatus) and muskmelon (Cucumis melo) widely grown in Spain, Environ Pollut, 81, 199-206, https://doi.org/10.1016/0269-7491(93)90202-Y, 1993.

Fontaine, V., Pelloux, J., Podor, M., Afif, D., Gérant, D., Grieu, P., and Dizengremel, P.: Carbon fixation in Pinus halepensis submitted to ozone. Opposite response of ribulose-1,5-bisphosphate carboxylase/oxygenase and phosphoenolpyruvate carboxylase, Physiologia Plantarum, 105, 187-192, https://doi.org/10.1034/j.1399-3054.1999.105201.x, 1999.

Fu, Y., Zhao, T. H., Sun, J. W., Cao, Y., H, Y., Xu, L., and Shi, Y.: Effects of elevated ozone concentration on maize photosynthesis and grain quality(In Chinese), Acta Agriculturae Boreali-Sinica, 23, 120-124, 2008.

Fusaro, L., Palma, A., Salvatori, E., Basile, A., Maresca, V., Asadi Karam, E., and Manes, F.: Functional indicators of response mechanisms to nitrogen deposition, ozone, and their interaction in two Mediterranean tree species, Plos One, 12, e0185836, 10.1371/journal.pone.0185836, 2017.

Gao, F., Calatayud, V., García-Breijo, F., Reig-Armiñana, J., and Feng, Z.: Effects of elevated ozone on physiological, anatomical and ultrastructural characteristics of four common urban tree species in China, Ecol Indic, 67, 367-379, https://doi.org/10.1016/j.ecolind.2016.03.012, 2016.

Ghosh, A., Agrawal, M., and Agrawal, S. B.: Effect of water deficit stress on an Indian wheat cultivar (Triticum aestivum L. HD 2967) under ambient and elevated level of ozone, Sci Total Environ, 714, 136837, 10.1016/j.scitotenv.2020.136837, 2020.

Ghosh, A., Pandey, A. K., Agrawal, M., and Agrawal, S. B.: Assessment of growth, physiological, and yield attributes of wheat cultivar HD 2967 under elevated ozone exposure adopting timely and delayed sowing conditions, Environ Sci Pollut R, 27, 17205-17220, 10.1007/s11356-020-08325-y, 2020.

Guidi, L., Remorini, D., Cotrozzi, L., Giordani, T., Lorenzini, G., Massai, R., Nali, C., Natali, L., Pellegrini, E., Trivellini, A., Vangelisti, A., Vernieri, P., and Landi, M.: The harsh life of an urban tree: the effect of a single pulse of ozone in salt-stressed Quercus ilex saplings, Tree Physiol, 37, 246-260, 10.1093/treephys/tpw103, 2017.

Hanson, P. J., Samuelson, L. J., Wullschleger, S. D., Tabberer, T. A., and Edwards, G. S.: Seasonal patterns of light-saturated photosynthesis and leaf conductance for mature and seedling Quercus rubra L. foliage: differential sensitivity to ozone exposure, Tree Physiol, 14, 1351-1366, 10.1093/treephys/14.12.1351, 1994.

Harmens, H., Hayes, F., Sharps, K., Mills, G., and Calatayud, V.: Leaf traits and photosynthetic responses of Betula pendula saplings to a range of ground-level ozone concentrations at a range of nitrogen loads, J Plant Physiol, 211, 42-52, https://doi.org/10.1016/j.jplph.2017.01.002, 2017.

Harmens, H., Hayes, F., Sharps, K., Radbourne, A., and Mills, G.: Can reduced irrigation mitigate ozone impacts on an ozone-sensitive African wheat variety?, Plants (Basel), 8, 10.3390/plants8070220, 2019.

Hartikainen, K., Riikonen, J., Nerg, A.-M., Kivimäenpää, M., Ahonen, V., Tervahauta, A., Kärenlampi, S., Mäenpää, M., Rousi, M., Kontunen-Soppela, S., Oksanen, E., and Holopainen, T.: Impact of elevated temperature and ozone on the emission of volatile organic compounds and gas exchange of silver birch (Betula pendula Roth), Environ Exp Bot, 84, 33-43, https://doi.org/10.1016/j.envexpbot.2012.04.014, 2012.

Hatata, M., Badar, R., Ibrahim, M., and Hassan, I.: Respective and interactive effects of O3 and CO2 and drought stress on photosynthesis, stomatal conductance, antioxidative ability and yield of wheat plants, Current World Environment Journal, 8, 409-417, http://dx.doi.org/10.12944/CWE.8.3.10, 2013.

Havranek, W. M., Wieser, G., and Bodner, M.: Ozone fumigation of Norway spruce at timberline, Ann Forest Sci, 46, 581s-585s, https://doi.org/10.1051/forest:198905ART0132, 1989.

Hayes, F., Wagg, S., Mills, G., Wilkinson, S., and Davies, W.: Ozone effects in a drier climate: implications for stomatal fluxes of reduced stomatal sensitivity to soil drying in a typical grassland species, Global Change Biol., 18, 948-959, https://doi.org/10.1111/j.1365-2486.2011.02613.x, 2012.

Herbinger, K., Then, C., Löw, M., Haberer, K., Alexou, M., Koch, N., Remele, K., Heerdt, C., Grill, D., Rennenberg, H., Häberle, K. H., Matyssek, R., Tausz, M., and Wieser, G.: Tree age dependence and within-canopy variation of leaf gas exchange and antioxidative defence in Fagus sylvatica under experimental free-air ozone exposure, Environ Pollut, 137, 476-482, https://doi.org/10.1016/j.envpol.2005.01.034, 2005.

Hoshika, Y., Watanabe, M., Inada, N., and Koike, T.: Ozone-induced stomatal sluggishness develops progressively in Siebold's beech (Fagus crenata), Environ Pollut, 166, 152-156, 10.1016/j.envpol.2012.03.013, 2012.

Hoshika, Y., Watanabe, M., Inada, N., and Koike, T.: Model-based analysis of avoidance of ozone stress by stomatal closure in Siebold's beech (Fagus crenata), Ann Bot, 112, 1149-1158, 10.1093/aob/mct166, 2013.

Inada, H., Kondo, T., Akhtar, N., Hoshino, D., Yamaguchi, M., and Izuta, T.: Relationship between cultivar difference in the sensitivity of net photosynthesis to ozone and reactive oxygen species scavenging system in Japanese winter wheat (Triticum aestivum), Physiologia Plantarum, 146, 217-227, https://doi.org/10.1111/j.1399-3054.2012.01618.x, 2012.

Kamal, M. Z. U., Yamaguchi, M., Kinose, Y., and Izuta, T.: Mitigation mechanism of ozone-induced reduction in net photosynthesis of Bangladeshi wheat under soil salinity stress, Photosynthetica, 57, 1025-1034, 10.32615/ps.2019.115, 2019.

Karlsson, P. E., Medin, E. L., Wallin, G., Selldén, G., and Skärby, L.: Effects of ozone and drought stress on the physiology and growth of two clones of Norway spruce (Picea abies), The New phytologist, 136, 265-275, https://doi.org/10.1046/j.1469-8137.1997.00735.x, 1997.

KellomäKi, S. and Wang, K. Y.: Effects of elevated O3 and CO2 concentrations on photosynthesis and stomatal conductance in Scots pine, Plant Cell Environ, 20, 995-1006, https://doi.org/10.1111/j.1365-3040.1997.tb00676.x, 1997.

Kinose, Y., Fukamachi, Y., Okabe, S., Hiroshima, H., Watanabe, M., and Izuta, T.: Nutrient supply to soil offsets the ozone-induced growth reduction in Fagus crenata seedlings, Trees, 31, 259-272, 10.1007/s00468-016-1481-7, 2016.

Kitao, M., Komatsu, M., Yazaki, K., Kitaoka, S., and Tobita, H.: Growth overcompensation against O3 exposure in two Japanese oak species, Quercus mongolica var. crispula and Quercus serrata, grown under elevated CO2, Environ Pollut, 206, 133-141, https://doi.org/10.1016/j.envpol.2015.06.034, 2015.

Kittipornkul, P., Krobthong, S., Yingchutrakul, Y., and Thiravetyan, P.: Mechanisms of ozone responses in sensitive and tolerant mungbean cultivars, Sci Total Environ, 800, 149550, 10.1016/j.scitotenv.2021.149550, 2021.

Kivimäenpää, M., Riikonen, J., Ahonen, V., Tervahauta, A., and Holopainen, T.: Sensitivity of Norway spruce physiology and terpenoid emission dynamics to elevated ozone and elevated temperature under open-field exposure, Environ Exp Bot, 90, 32-42, https://doi.org/10.1016/j.envexpbot.2012.11.004, 2013.

Kronfuß, G., Polle, A., Tausz, M., Havranek, W. M., and Wieser, G.: Effects of ozone and mild drought stress on gas exchange, antioxidants and chloroplast pigments in current-year needles of young Norway spruce [Picea abies (L.) Karst.], Trees, 12, 482-489, 10.1007/PL00009730, 1998.

Kumari, S., Agrawal, M., and Singh, A.: Effects of ambient and elevated CO2 and ozone on physiological characteristics, antioxidative defense system and metabolites of potato in relation to ozone flux, Environ Exp Bot, 109, 276-287, https://doi.org/10.1016/j.envexpbot.2014.06.015, 2015.

Le Thiec, D. and Manninen, S.: Ozone and water deficit reduced growth of Aleppo pine seedlings, Plant Physiol Bioch, 41, 55-63, 10.1016/s0981-9428(02)00009-8, 2003.

Leonardi, S. and Langebartels, C.: Fall exposure of beech saplings (Fagus sylvatica L.) to ozone and simulated acidic mist: Effects on gas exchange and leachability, Water Air Soil Poll, 54, 143-153, 10.1007/BF00298661, 1990.

Leverenz, J. W., Paludan-MÜLler, G., and Saxe, H.: Response to three seasons of elevated ozone in the progeny of healthy and unhealthy Norway spruce trees from a plantation with the 'top dying' syndrome, The New phytologist, 142, 259-270, https://doi.org/10.1046/j.1469-8137.1999.00387.x, 1999.

Li, L., Manning, W. J., Tong, L., and Wang, X.: Chronic drought stress reduced but not protected Shantung maple (Acer truncatum Bunge) from adverse effects of ozone (O3) on growth and physiology in the suburb of Beijing, China, Environ Pollut, 201, 34-41, https://doi.org/10.1016/j.envpol.2015.02.023, 2015.

Li, S., Feng, Z., Yuan, X., Wang, M., and Agathokleous, E.: Elevated ozone inhibits isoprene emission of a diploid and a triploid genotype of Populus tomentosa by different mechanisms, J Exp Bot, 73, 6449-6462, 10.1093/jxb/erac288, 2022.

Li, C., Zhu, J., Zeng, Q., Luo, K., Liu, B., Liu, G., and Tang, H.: Different responses of transgenic Bt rice and conventional rice to elevated ozone concentration, Environ Sci Pollut Res Int, 24, 8352-8362, 10.1007/s11356-017-8508-5, 2017.

Lippert, M., Steiner, K., Payer, H.-D., Simons, S., Langebartels, C., and Sandermann, H.: Assessing the impact of ozone on photosynthesis of European beech (Fergus sylvatica L.) in environmental chambers, Trees, 10, 268-275, 10.1007/BF02185679, 1996.

Llusia, J., Bermejo-Bermejo, V., Calvete-Sogo, H., and Penuelas, J.: Decreased rates of terpene emissions in Ornithopus compressus L. and Trifolium striatum L. by ozone exposure and nitrogen fertilization, Environ Pollut, 194, 69-77, 10.1016/j.envpol.2014.06.038, 2014.

Löw, M., Häberle, K. H., Warren, C. R., and Matyssek, R.: O3 flux-related responsiveness of photosynthesis, respiration, and stomatal conductance of adult Fagus sylvatica to experimentally enhanced Free-Air O3 exposure, Plant Biology, 9, 197-206, https://doi.org/10.1055/s-2006-924656, 2007.

Ma, Y. Z., Yang, X. L., Xu, Y. S., and Feng, Z. Z.: Response of key parameters of leaf photosynthetic models to increased ozone concentration in four common trees (in Chinese, Chinese Journal of Plant Ecology, 46, 321-329, 2022.

Maenpaa, M., Riikonen, J., Kontunen-Soppela, S., Rousi, M., and Oksanen, E.: Vertical profiles reveal impact of ozone and temperature on carbon assimilation of Betula pendula and Populus tremula, Tree Physiol, 31, 808-818, 10.1093/treephys/tpr075, 2011.

Marzuoli, R., Monga, R., Finco, A., and Gerosa, G.: Biomass and physiological responses of Quercus robur (L.) young trees during 2 years of treatments with different levels of ozone and nitrogen wet deposition, Trees, 30, 1995-2010, 10.1007/s00468-016-1427-0, 2016.

Marzuoli, R., Monga, R., Finco, A., Chiesa, M., and Gerosa, G.: Increased nitrogen wet deposition triggers negative effects of ozone on the biomass production of Carpinus betulus L. young trees, Environ Exp Bot, 152, 128-136, https://doi.org/10.1016/j.envexpbot.2017.10.017, 2018.

Michael Robinson, J. and Britz, S. J.: Tolerance of a field grown soybean cultivar to elevated ozone level is concurrent with higher leaflet ascorbic acid level, higher ascorbate-dehydroascorbate redox status, and long term photosynthetic productivity, Photosynth Res, 64, 77-87, 10.1023/A:1026508227189, 2000.

Mikkelsen, T. N.: Physiological responses of Fagus sylvatica L. exposed to low levels of ozone in open-top chambers, Trees, 9, 355-361, 10.1007/BF00202500, 1995.

Miller, J. E., Booker, F. L., Fiscus, E. L., Heagle, A. S., Pursley, W. A., Vozzo, S. F., and Heck, W. W.: Ultraviolet-B radiation and ozone effects on growth, yield, and photosynthesis of soybean, J Environ Qual, 23, 83-91, https://doi.org/10.2134/jeq1994.00472425002300010012x, 1994.

Mishra, A. K. and Agrawal, S. B.: Biochemical and physiological characteristics of tropical mung bean (Vigna radiata L.) cultivars against chronic ozone stress: an insight to cultivar-specific response, Protoplasma, 252, 797-811, 10.1007/s00709-014-0717-x, 2015.

Moraes, R. M., Bulbovas, P., Furlan, C. M., Domingos, M., Meirelles, S. T., Delitti, W. B. C., and Sanz, M. J.: Physiological responses of saplings of Caesalpinia echinata Lam., a Brazilian tree species, under ozone fumigation, Ecotoxicology and Environmental Safety, 63, 306-312, https://doi.org/10.1016/j.ecoenv.2004.10.009, 2006.

Noble, R. D., Jensen, K. F., Ruff, B. S., and Loats, K. V.: Response of Acer saccharum seedlings to elevated carbon dioxide and ozone, The Ohio Journal of Science, 92, 60-62, 1992.

Novak, K., Schaub, M., Fuhrer, J., Skelly, J. M., Hug, C., Landolt, W., Bleuler, P., and Kräuchi, N.: Seasonal trends in reduced leaf gas exchange and ozone-induced foliar injury in three ozone sensitive woody plant species, Environ Pollut, 136, 33-45, https://doi.org/10.1016/j.envpol.2004.12.018, 2005.

Oksanen, E., Freiwald, V., Prozherina, N., and Rousi, M.: Photosynthesis of birch (Betula pendula) is sensitive to springtime frost and ozone, Can J Forest Res, 35, 703-712, 10.1139/x05-007, 2005.

Oksanen, E., Amores, G., Kokko, H., Santamaria, J. M., and Kärenlampi, L.: Genotypic variation in growth and physiological responses of Finnish hybrid aspen (Populus tremuloides × P. tremula) to elevated tropospheric ozone concentration, Tree Physiol, 21, 1171-1181, 10.1093/treephys/21.16.1171, 2001.

PÄÄkkÖ, N. E., Metsärinne, S., Holopainen, T., and Kärenlampi, L.: The ozone sensitivity of birch (Betula pendula) in relation to the developmental stage of leaves, The New phytologist, 132, 145-154, 10.1111/j.1469-8137.1996.tb04520.x, 1996.

Pääkkönen, E., Vahala, J., Pohjola, M., Holopainen, T., and Kärenlampi, L.: Physiological, stomatal and ultrastructural ozone responses in birch (Betula pendula Roth.) are modified by water stress, Plant Cell Environ, 21, 671-684, https://doi.org/10.1046/j.1365-3040.1998.00303.x, 1998.

PÄÄKkÖNen, E., GÜNthardt-Goerg, M. S., and Holopainen, T.: Responses of leaf processes in a sensitive birch (Betula pendula Roth) clone to ozone combined with drought, Ann Bot, 82, 49-59, https://doi.org/10.1006/anbo.1998.0656, 1998.

Paludan-MÜLler, G., Saxe, H., and Leverenz, J. W.: Responses to ozone in 12 provenances of European beech (Fagus sylvatica): genotypic variation and chamber effects on photosynthesis and dry-matter partitioning, The New phytologist, 144, 261-273, https://doi.org/10.1046/j.1469-8137.1999.00518.x, 1999.

Paoletti, E. and Grulke, N. E.: Ozone exposure and stomatal sluggishness in different plant physiognomic classes, Environ Pollut, 158, 2664-2671, 10.1016/j.envpol.2010.04.024, 2010.

Paoletti, E., Nali, C., and Lorenzini, G.: Early responses to acute ozone exposure in two Fagus sylvatica clones differing in xeromorphic adaptations: photosynthetic and stomatal processes, membrane and epicuticular characteristics, Environ Monit Assess, 128, 93-108, 10.1007/s10661-006-9418-z, 2007.

Paoletti, E., Hoshika, Y., Arab, L., Martini, S., Cotrozzi, L., Weber, D., Ache, P., Neri, L., Baraldi, R., Pellegrini, E., Muller, H. M., Hedrich, R., Alfarraj, S., and Rennenberg, H.: Date palm responses to a chronic, realistic ozone exposure in a FACE experiment, Environ Res, 195, 110868, 10.1016/j.envres.2021.110868, 2021.

Pell, E. J., Eckardt, N., and Enyedi, A. J.: Timing of ozone stress and resulting status of ribulose bisphosphate carboxylase/oxygenase and associated net photosynthesis, The New phytologist, 120, 397-405, https://doi.org/10.1111/j.1469-8137.1992.tb01080.x, 1992.

Pellegrini, E., Francini, A., Lorenzini, G., and Nali, C.: PSII photochemistry and carboxylation efficiency in Liriodendron tulipifera under ozone exposure, Environ Exp Bot, 70, 217-226, 10.1016/j.envexpbot.2010.09.012, 2011.

Pellegrini, E., Cotrozzi, L., Neri, L., Baraldi, R., Carrari, E., Nali, C., Lorenzini, G., Paoletti, E., and Hoshika, Y.: Stress markers and physiochemical responses of the Mediterranean shrub Phillyrea angustifolia under current and future drought and ozone scenarios, Environ Res, 201, 111615, 10.1016/j.envres.2021.111615, 2021.

Peng, B., Lai, S. K., Li, P. L., Wang, Y. X., Zhu, J. G., Yang, L. X., and Wang, Y. L.: Effects of ozone stress on photosynthesis and dry matter production of rice II-you 084 under different planting densities (in Chinese), Chinese Journal of Applied Ecology, 26, 17-24, 10.13287/j.1001-9332.2015.0001, 2015.

Plażek, A., Rapacz, M., and Skoczowski, A.: Effects of ozone fumigation on photosynthesis and membrane permeability in leaves of spring barley, ,meadow fescue, and winter rape, Photosynthetica, 38, 409-413, 10.1023/A:1010977605850, 2000.

Power, S. A. and Ashmore, M. R.: Responses of fen and fen-meadow communities to ozone, The New phytologist, 156, 399-408, 10.1046/j.1469-8137.2002.00540.x, 2002.

Rai, R., Agrawal, M., and Agrawal, S. B.: Effects of ambient O3 on wheat during reproductive development: Gas exchange, photosynthetic pigments, chlorophyll fluorescence, and carbohydrates, Photosynthetica, 49, 285-294, 10.1007/s11099-011-0038-7, 2011.

Rebbeck, J. and Loats, K. V.: Ozone effects on seedling sugar maple (Acer saccharum) and yellow-poplar (Liriodendron tulipifera): gas exchange, Can J Forest Res, 27, 1595-1605, 10.1139/x97-121, 1997.

Rebbeck, J., Jensen, K. F., and Greenwood, M. S.: Ozone effects on grafted mature and juvenile red spruce: photosynthesis, stomatal conductance, and chlorophyll concentration, Can J Forest Res, 23, 450-456, 10.1139/x93-063, 1993.

Rebbeck, J., Scherzer, A. J., and Loats, K. V.: Foliar physiology of yellow-poplar (Liriodendron tulipifera L.) exposed to O3 and elevated CO2 over five seasons, Trees, 18, 253-263, 10.1007/s00468-003-0302-y, 2004.

Reich, P. B. and Lassoie, J. P.: Effects of low level O3 exposure on leaf diffusive conductance and water-use efficiency in hybrid poplar, Plant Cell Environ, 7, 661-668, https://doi.org/10.1111/1365-3040.ep11571645, 1984.

Richardson, C. J., Sasek, T. W., Fendick, E. A., and Kress, L. W.: Ozone exposure-response relationships for photosynthesis in genetic strains of loblolly pine seedlings, Forest Ecol Manag, 51, 163-178, https://doi.org/10.1016/0378-1127(92)90482-O, 1992.

Riikonen, J., Kontunen-Soppela, S., Ossipov, V., Tervahauta, A., Tuomainen, M., Oksanen, E., Vapaavuori, E., Heinonen, J., and Kivimaenpaa, M.: Needle metabolome, freezing tolerance and gas exchange in Norway spruce seedlings exposed to elevated temperature and ozone concentration, Tree Physiol, 32, 1102-1112, 10.1093/treephys/tps072, 2012.

Rudorff, B. F. T., Mulchi, C. L., Lee, E., Rowland, R., and Pausch, R.: Photosynthetic characteristics in wheat exposed to elevated O3 and CO2, Crop Sci, 36, 1247-1251, https://doi.org/10.2135/cropsci1996.0011183X003600050029x, 1996.

Ryan, A., Cojocariu, C., Possell, M., Davies, W. J., and Hewitt, C. N.: Defining hybrid poplar (Populus deltoides x Populus trichocarpa) tolerance to ozone: identifying key parameters, Plant Cell Environ, 32, 31-45, 10.1111/j.1365-3040.2008.01897.x, 2009.

Salvatori, E., Fusaro, L., Mereu, S., Bernardini, A., Puppi, G., and Manes, F.: Different O3 response of sensitive and resistant snap bean genotypes (Phaseolus vulgaris L.): The key role of growth stage, stomatal conductance, and PSI activity, Environ Exp Bot, 87, 79-91, 10.1016/j.envexpbot.2012.09.008, 2013.

Sanmartin, M., Drogoudi, P. A., Lyons, T., Pateraki, I., Barnes, J., and Kanellis, A. K.: Over-expression of ascorbate oxidase in the apoplast of transgenic tobacco results in altered ascorbate and glutathione redox states and increased sensitivity to ozone, Planta, 216, 918-928, 10.1007/s00425-002-0944-9, 2003.

Schaub, M., Skelly, J. M., Steiner, K. C., Davis, D. D., Pennypacker, S. P., Zhang, J., Ferdinand, J. A., Savage, J. E., and Stevenson, R. E.: Physiological and foliar injury responses of Prunus serotina, Fraxinus americana, and Acer rubrum seedlings to varying soil moisture and ozone, Environ Pollut, 124, 307-320, 10.1016/s0269-7491(02)00462-1, 2003.

Schloter, M., Winkler, J. B., Aneja, M., Koch, N., Fleischmann, F., Pritsch, K., Heller, W., Stich, S., Grams, T. E., Gottlein, A., Matyssek, R., and Munch, J. C.: Short term effects of ozone on the plant-

rhizosphere-bulk soil system of young beech trees, Plant Biology, 7, 728-736, 10.1055/s-2005-872987, 2005.

Shang, B., Feng, Z., Peng, J., Xu, Y., Paoletti, E., and Liu, L.: Effects of elevated ozone and nitrogen addition on leaf nitrogen metabolism in poplar, J Plant Ecol, 14, 555-568, 10.1093/jpe/rtab010, 2021.

Singh, P., Agrawal, M., and Agrawal, S. B.: Evaluation of physiological, growth and yield responses of a tropical oil crop (Brassica campestris L. var. Kranti) under ambient ozone pollution at varying NPK levels, Environ Pollut, 157, 871-880, 10.1016/j.envpol.2008.11.008, 2009.

Soldatini, G. F., Nali, C., Guidi, L., and Lorenzini, G.: Photosynthesis of Hedera canariensis var. azorica variegated leaves as affected by ozone, Photosynthetica, 35, 247-253, 10.1023/A:1006914924287, 1998.

Soldatini, G. F., Lorenzini, G., Filippi, F., Nali, C., and Guidi, L.: Photosynthesis of two poplar clones under long-term exposure to ozone, Physiologia Plantarum, 104, 707-712, https://doi.org/10.1034/j.1399-3054.1998.1040427.x, 1998.

Su, B., Zhou, M., Xu, H., Zhang, X., Li, Y., Su, H., and Xiang, B.: Photosynthesis and biochemical responses to elevated O3 in Plantago major and Sonchus oleraceus growing in a lowland habitat of northern China, J Environ Sci, 53, 113-121, 10.1016/j.jes.2016.05.011, 2017.

Sugai, T., Kitao, M., Watanabe, T., and Koike, T.: Can needle nitrogen content explain the interspecific difference in ozone sensitivities of photosynthesis between Japanese larch (Larix kaempferi) and Sakhalin fir (Abies sachalinensis)?, Photosynthetica, 57, 540-547, 10.32615/ps.2019.042, 2019.

Sugai, T., Watanabe, T., Kita, K., and Koike, T.: Nitrogen loading increases the ozone sensitivity of larch seedlings with higher sensitivity to nitrogen loading, Sci Total Environ, 663, 587-595, 10.1016/j.scitotenv.2019.01.292, 2019.

Sun, J., Feng, Z., and Ort, D. R.: Impacts of rising tropospheric ozone on photosynthesis and metabolite levels on field grown soybean, Plant Sci, 226, 147-161, 10.1016/j.plantsci.2014.06.012, 2014.

Takemoto, B. K., Bytnerowicz, A., Dawson, P. J., Morrison, C. L., and Temple, P. J.: Effects of ozone on Pinus ponderosa seedlings: comparison of responses in the first and second growing seasons of exposure, Can J Forest Res, 27, 23-30, 10.1139/x96-141, 1997.

Tao, H. C., Xu, S., Fu, W., He, X. Y., Chen, W., Ma, C. L., Li, Y., and Wu, X.: Effects of elevated O3 concentration and drought on photosynthetic physiological characteristics of Syringa oblate leaves (In Chinese), Jiangsu Agricultural Sciences, 47, 186-190, 10.15889/j.issn.1002-1302.2019.11.042, 2019.

Tetteh, R., Yamaguchi, M., Wada, Y., Funada, R., and Izuta, T.: Effects of ozone on growth, net photosynthesis and yield of two African varieties of Vigna unguiculata, Environ Pollut, 196, 230-238, 10.1016/j.envpol.2014.10.008, 2015.

Then, C., Herbinger, K., Luis, V. C., Heerdt, C., Matyssek, R., and Wieser, G.: Photosynthesis, chloroplast pigments, and antioxidants in Pinus canariensis under free-air ozone fumigation, Environ Pollut, 157, 392-395, 10.1016/j.envpol.2008.09.044, 2009.

Tjoelker, M. G. and Luxmoore, R. J.: Soil nitrogen and chronic ozone stress influence physiology, growth and nutrient status of Pinus taeda L. and Liriodendron tulipifera L. seedlings, The New phytologist, 119, 69-81, 10.1111/j.1469-8137.1991.tb01009.x, 1991.

Tjoelker, M. G., Volin, J. C., Oleksyn, J., and Reich, P. B.: Light environment alters response to ozone stress in seedlings of Acer saccharum Marsh, and hybrid Populus L.: I. In situ net photosynthesis, dark respiration and growth, The New phytologist, 124, 627-636, 10.1111/j.1469-8137.1993.tb03852.x, 1993.

Tjoelker, M. G., Volin, J. C., Oleksyn, J., and Reich, P. B.: Interaction of ozone pollution and light effects on photosynthesis in a forest canopy experiment, Plant Cell Environ, 18, 895-905, https://doi.org/10.1111/j.1365-3040.1995.tb00598.x, 1995.

Torsethaugen, G., Pitcher, L. H., Zilinskas, B. A., and Pell, E. J.: Overproduction of ascorbate peroxidase in the tobacco chloroplast does not provide protection against ozone, Plant physiology, 114, 529-537, 10.1104/pp.114.2.529, 1997.

Utriainen, J. and Holopainen, T.: Influence of nitrogen and phosphorous availability and ozone stress on Norway spruce seedlings, Tree Physiol, 21, 447-456, 10.1093/treephys/21.7.447, 2001.

Vitale, M., Salvatori, E., Loreto, F., Fares, S., and Manes, F.: Physiological responses of quercus ilex leaves to water stress and acute ozone exposure under controlled conditions, Water Air Soil Poll, 189, 113-125, 10.1007/s11270-007-9560-4, 2007.

Volin, J. C., Reich, P. B., and Givnish, T. J.: Elevated carbon dioxide ameliorates the effects of ozone on photosynthesis and growth: species respond similarly regardless of photosynthetic pathway or plant functional group, The New phytologist, 138, 315-325, 10.1046/j.1469-8137.1998.00100.x, 1998.

Wallin, G., Ottosson, S., and Selldén, G.: Long-term exposure of Norway spruce, Picea abies (L.) Karst., to ozone in open-top chambers: IV. Effects on the stomatal and non-stomatal limitation of photosynthesis

and on the carboxylation efficiency, The New phytologist, 121, 395-401, 10.1111/j.1469-8137.1992.tb02939.x, 1992.

Wang, L. L.: Co-ordination of photosynthesis and stomatal responses of Mongolian oak (Quercus mongolica fisch. ex ledeb.) to elevated O3 and/or CO2 Levels, Appl Ecol Env Res, 17, 4257-4268, 10.15666/aeer/1702_42574268, 2019.

Wang, S. G., Diao, X. J., Li, Y. W., and Ma, L. M.: Effect of glomus aggregatumon photosynthetic function of snap bean in response to elevated ozone, The Journal of Agricultural Science, 153, 837-852, 10.1017/s0021859615000040, 2015.

Watanabe, M., Hoshika, Y., and Koike, T.: Photosynthetic responses of Monarch birch seedlings to differing timings of free air ozone fumigation, J Plant Res, 127, 339-345, 10.1007/s10265-013-0622-y, 2014.

Watanabe, M., Kinose, Y., and Izuta, T.: Photosynthesis of three evergreen broad-leaved tree species, Castanopsis sieboldii, Quercus glauca, and Q. myrsinaefolia, under elevated ozone, iForest, 11, 360-366, 10.3832/ifor2493-011, 2018.

Watanabe, M., Umemoto-Yamaguchi, M., Koike, T., and Izuta, T.: Growth and photosynthetic response of Fagus crenata seedlings to ozone and/or elevated carbon dioxide, Landsc Ecol Eng, 6, 181-190, 10.1007/s11355-009-0095-2, 2009.

Wei, C., Skelly, J. M., Pennypacker, S. P., Ferdinand, J. A., Savage, J. E., Stevenson, R. E., and Davis, D. D.: Influence of light fleck and low light on foliar injury and physiological responses of two hybrid poplar clones to ozone, Environ Pollut, 130, 215-227, 10.1016/j.envpol.2003.12.009, 2004.

Wiese, C. B. and Pell, E. J.: Influence of ozone on transgenic tobacco plants expressing reduced quantities of Rubisco, Plant Cell Environ, 20, 1283-1291, https://doi.org/10.1046/j.1365-3040.1997.d01-168.x, 1997.

Wilkinson, S. and Davies, W. J.: Ozone suppresses soil drying- and abscisic acid (ABA)-induced stomatal closure via an ethylene-dependent mechanism, Plant Cell Environ, 32, 949-959, 10.1111/j.1365-3040.2009.01970.x, 2009.

Wullschleger, S. D., Hanson, P. J., and Edwards, G. S.: Growth and maintenance respiration in leaves of northern red oak seedlings and mature trees after 3 years of ozone exposure, Plant Cell Environ, 19, 577-584, https://doi.org/10.1111/j.1365-3040.1996.tb00391.x, 1996.

Xu, Y., Shang, B., Feng, Z., and Tarvainen, L.: Effect of elevated ozone, nitrogen availability and mesophyll conductance on the temperature responses of leaf photosynthetic parameters in poplar, Tree Physiol, 40, 484-497, 10.1093/treephys/tpaa007, 2020.

Xu, Y., Feng, Z., Shang, B., Yuan, X., and Tarvainen, L.: Limited water availability did not protect poplar saplings from water use efficiency reduction under elevated ozone, Forest Ecol Manag, 462, 10.1016/j.foreco.2020.117999, 2020.

Xu, S., He, X., Chen, W., Huang, Y., Zhao, Y., and Li, B.: Differential sensitivity of four urban tree species to elevated O3, Urban For Urban Gree, 14, 1166-1173, 10.1016/j.ufug.2015.10.015, 2015.

Xu, W., Shang, B., Xu, Y., Yuan, X., Dore, A. J., Zhao, Y., Massad, R. S., and Feng, Z.: Effects of elevated ozone concentration and nitrogen addition on ammonia stomatal compensation point in a poplar clone, Environ Pollut, 238, 760-770, 10.1016/j.envpol.2018.03.089, 2018.

Yamaguchi, M., Kinose, Y., Matsumura, H., and Izuta, T.: Evaluation of O3 effects on cumulative photosynthetic CO2 uptake in seedlings of four Japanese deciduous broad-leaved forest tree species based on stomatal O3 uptake, Forests, 10, 10.3390/f10070556, 2019.

Yamaguchi, M., Hoshino, D., Kondo, T., Satoh, R., Inada, H., and Izuta, T.: Evaluation of O3 effect on net photosynthetic rate in flag leaves of rice (Oryza sativa L.) by stomatal O3 flux and radical scavenging enzyme activities, J Agric Meteorol, 71, 211-217, 10.2480/agrmet.D-14-00014, 2015.

Yan, K., Chen, W., He, X., Zhang, G., Xu, S., and Wang, L.: Responses of photosynthesis, lipid peroxidation and antioxidant system in leaves of Quercus mongolica to elevated O3, Environ Exp Bot, 69, 198-204, 10.1016/j.envexpbot.2010.03.008, 2010.

Yang, N., Wang, X., Zheng, F., and Chen, Y.: The response of marigold (Tagetes erecta Linn.) to ozone: impacts on plant growth and leaf physiology, Ecotoxicology, 26, 151-164, 10.1007/s10646-016-1750-7, 2017.

Yang, J. L., Xu, S., C.L., M., Han, Z. S., Li, D., Li, Y., Wang, N., Wang, Y. J., and He, X. Y.: Comparison of physiological characteristics of two ornamental grass species under elevated ozone concentrations (In Chinese), Acta Ecologica Sinica, 41, 7763-7773, 2021.

Yonekura, T., Dokiya, Y., Fukami, M., and Izuta, T.: Effects of ozone and/or soil water stress on growth and photosynthesis of Fagaus crenata seedlings, in: Acid rain 2000: Proceedings from the 6th International Conference on Acidic Deposition: Looking back to the past and thinking of the future

Tsukuba, Japan, 10–16 December 2000 Volume III/III Conference Statement Plenary and Keynote Papers, edited by: Satake, K., Shindo, J., Takamatsu, T., Nakano, T., Aoki, S., Fukuyama, T., Hatakeyama, S., Ikuta, K., Kawashima, M., Kohno, Y., Kojima, S., Murano, K., Okita, T., Taoda, H., Tsunoda, K., and Tsurumi, M., Springer Netherlands, Dordrecht, 965-970, 10.1007/978-94-007-0810-5_8, 2001.

Yuan, X., Li, S., Feng, Z., Xu, Y., Shang, B., Fares, S., and Paoletti, E.: Response of isoprene emission from poplar saplings to ozone pollution and nitrogen deposition depends on leaf position along the vertical canopy profile, Environ Pollut, 265, 114909, 10.1016/j.envpol.2020.114909, 2020.

Yuan, X., Shang, B., Xu, Y., Xin, Y., Tian, Y., Feng, Z., and Paoletti, E.: No significant interactions between nitrogen stimulation and ozone inhibition of isoprene emission in Cathay poplar, Sci Total Environ, 601-602, 222-229, 10.1016/j.scitotenv.2017.05.138, 2017.

Zeuthen, J., Mikkelsen, T. N., Paludan-Müller, G., and Ro-Poulsen, H.: Effects of increased UV-B radiation and elevated levels of tropospheric ozone on physiological processes in European beech (Fagus sylvatica), Physiologia Plantarum, 100, 281-290, https://doi.org/10.1111/j.1399-3054.1997.tb04784.x, 1997.

Zhang, W., Feng, Z., Wang, X., and Niu, J.: Elevated ozone negatively affects photosynthesis of current-year leaves but not previous-year leaves in evergreen Cyclobalanopsis glauca seedlings, Environ Pollut, 184, 676-681, 10.1016/j.envpol.2013.04.036, 2014.

Zhang, W., Feng, Z., Wang, X., and Niu, J.: Impacts of elevated ozone on growth and photosynthesis of Metasequoia glyptostroboides Hu et Cheng, Plant Sci, 226, 182-188, 10.1016/j.plantsci.2014.06.005, 2014.

Zhang, J., Ferdinand, J. A., Vanderheyden, D. J., Skelly, J. M., and Innes, J. L.: Variation of gas exchange within native plant species of Switzerland and relationships with ozone injury: an open-top experiment, Environ Pollut, 113, 177-185, 10.1016/s0269-7491(00)00175-5, 2001.

Zhang, W. W., Niu, J. F., Wang, X. K., Tian, Y., Yao, F. F., and Feng, Z. Z.: Effects of ozone exposure on growth and photosynthesis of the seedlings of Liriodendron chinense (Hemsl.) Sarg, a native tree species of subtropical China, Photosynthetica, 49, 29-36, 10.1007/s11099-011-0003-5, 2011.

Zheng, Y., Cheng, D., and Simmons, M.: Ozone pollution effects on gas exchange, growth and biomass yield of salinity-treated winter wheat cultivars, Sci Total Environ, 499, 18-26, 10.1016/j.scitotenv.2014.08.049, 2014.

Zouzoulas, D., Koutroubas, S. D., Vassiliou, G., and Vardavakis, E.: Effects of ozone fumigation on cotton (Gossypium hirsutum L.) morphology, anatomy, physiology, yield and qualitative characteristics of fibers, Environ Exp Bot, 67, 293-303, 10.1016/j.envexpbot.2009.05.016, 2009.

Table S1. The number of paired data points corresponding to various ozone-flux thresholds Y for photosynthetic response.

Y	BT	NT	Shrub	Grass	Crop
0.5	895	217	0	40	605
0.8	943	140	0	37	481
1	902	122	0	37	589
1.6	831	142	0	27	566
2	833	102	0	40	572
3	870	33	0	32	380
4	729	63	8	28	521
5	625	21	153	20	557
6	567	2	153	24	518

Table S2. Same as Table S1 but for stomatal response.

Y	BT	NT	Shrub	Grass	Crop
0.5	944	205	0	77	691
0.8	1045	186	0	77	591
1	1281	232	0	72	552
1.6	973	202	0	76	559
2	918	145	0	78	558
3	913	102	0	48	540
4	843	68	1	51	516
5	611	5	149	48	452
6	486	3	149	42	418
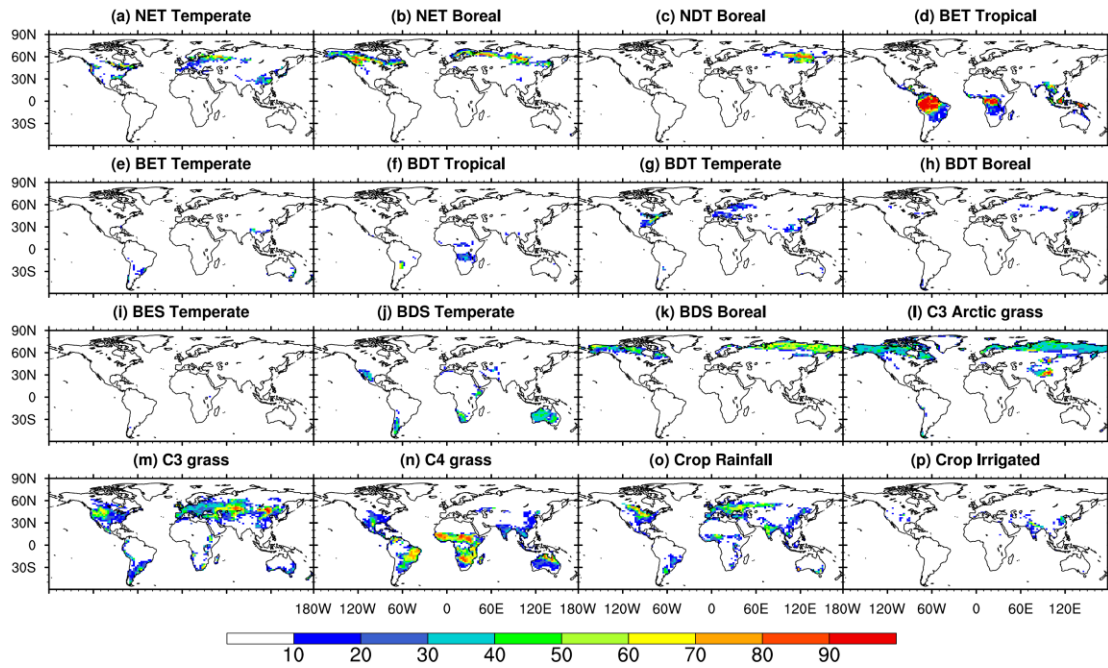
Figure. S1. Global distribution of the prescribed PFT fractional coverage (%) used by the component set

I2000Clm50Sp of CESM2.2.
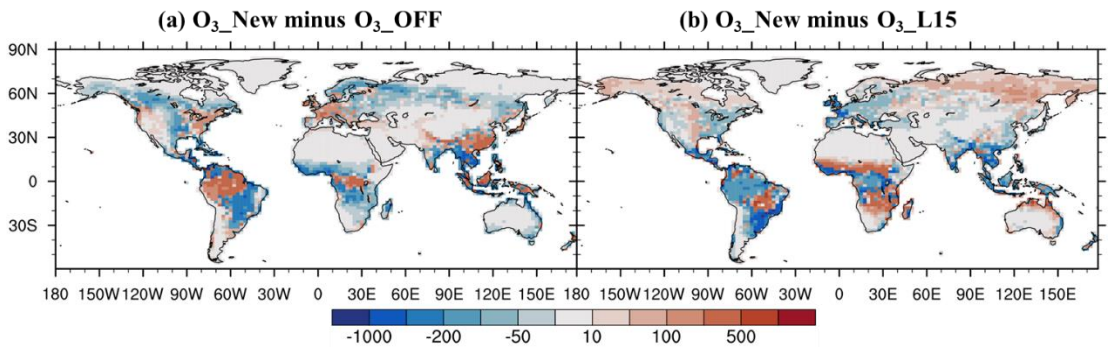
Figure. S2. Difference in Root Mean Square Error (RMSE) (g C m^{-2} yr^{-1}) (a) between O$_3$_New and

O$_3$_OFF and (b) between O$_3$_New and O$_3$_L15 in simulating annual Gross primary productivity (GPP).
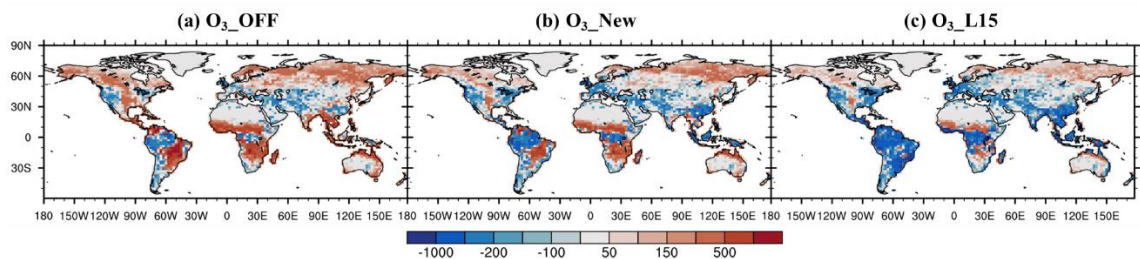
Figure. S3. Bias (simulation minus observations) in GPP (g C m^{-2} yr^{-1}) for (a) O$_3$_OFF, (b) O$_3$_New,

and (c) O$_3$_L15 simulations when compared with FLUXCOM.