Press Release

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Long-term Experiment Großbeeren: 50 Years of Data for Sustainable Open-field Vegetable Production

Publication of the Long-term Box Plot Experiment Großbeeren

For 50 years, scientists in Großbeeren have studied how different fertilization strategies affect vegetable and soil quality. The box plot facility in Großbeeren hosted one of the world's longest fertilization experiments with vegetables. From 1972 to 2022, data were collected and have now been published by researchers from the Leibniz Institute of Vegetable and Ornamental Crops (IGZ). The freely accessible data in the "BonaRes Repository for Soil and Agricultural Research Data" support sustainable soil management and more environmentally friendly open-field vegetable production.

The experiment was initiated in 1972 as a joint project of the Academy of Agricultural Sciences of the GDR and Humboldt University of Berlin. With a duration of 50 years, it ranks among the longest-running field experiments for vegetable cultivation worldwide. The goal was to investigate the effects of different organic and mineral fertilizers within the soil-plant-environment system. To achieve this, data were collected on carbon, nitrogen, phosphorus, potassium, and magnesium in soil and plants. While most long-term experiments focus on arable crops, the Großbeeren experiment examined various vegetable species: white cabbage, carrot, cucumber, leek, and celery. The trials were conducted on three different soil types (sand, sandy loam, and loam), with twelve experimental treatments varying the quantity and combination of organic and mineral nitrogen fertilizers.

The long-term experiment was managed scientifically, technically, and horticulturally by numerous staff members of the participating institutions. To date, the experiment has resulted in 35 scientific publications and ten doctoral dissertations. Since the establishment of the IGZ in 1992, the trial has been led by Dr Jörg Rühlmann, IGZ research group leader. Together with Dr Eric Bönecke and Dominik Müller, he prepared and published the collected data, which are now available to scientists worldwide.

Long-term studies like this are essential for quantifying and understanding the slow processes occurring in soils and for developing strategies for sustainable land management. A key focus of long-term fertilization experiments is the calculation of **nutrient balances:** How much nutrients are added to the system? How much remain in plants and soil? How much are released into the environment? These insights help optimize fertilization requirements, allowing horticulturists to maintain high yields with minimal fertilizer use while reducing nutrient input into the environment. This knowledge not only helps to understand past developments but also provides a foundation for future innovations in horticulture.

Further Information

- **Original Publication:** Eric Bönecke, Dominik Müller, Jörg Rühlmann (2024). *50 years box plot experiment in Großbeeren (1972 - 2022) - Plots, Dataset, BonaRes Repository* DOI: https://doi.org/10.20387/bonares-fd75-nca9
- **Overview of the Experimental Setup:** https://tools.bonares.de/ltfe/lte-details/348/
- **Project Page for the Box Plot Experiment:** https://igzev.de/institut/mitarbeitende/detail/115/119/kpa

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Leibniz Institute of Vegetable and Ornamental Crops

The Leibniz Institute of Vegetable and Ornamental Crops (IGZ) is a research institute of the Leibniz Association and contributes to solving current global challenges with science-based findings from basic and applied research in horticulture. These include the preservation of biodiversity, combating climate change and the still widespread malnutrition. The institute is jointly funded by the Ministry of Science, Research and Culture of the State of Brandenburg (MWFK) and the Federal Ministry of Food and Agriculture (BMEL). The IGZ is based in Großbeeren.

Photo

As part of the long-term fertilization experiment, vegetable crops such as celery were cultivated. Photo: IGZ/B. Löffelbein

The photo can be used free of charge in connection with reporting on the press release. A high-resolution version is available at the following link: https://igzev.de/download_file/51c29b35-ec31-4519-adf6-9aa8160eb239/9