



Volcanic particles in agriculture and gardening

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Volcanic pyroclasts of small size, such as lapilli and small pumice stones, are widely used in agriculture, gardening, and for pot plants as natural inorganic mulch. The technique of using pyroclasts to enhance topsoil stems from the eighteenth century, and specifically from the ad 1730–1736 eruption on Lanzarote. Critical observations on plant development during and after the eruption showed that the vegetation died when buried under a thick layer of lapilli, but grew vigorously when covered thinly. While the agriculture of Lanzarote was restricted to cereals before the eruption, it diversified to many kinds of fruit and vegetables afterwards, including the production of the famous Malvasía wines in the Canaries. The population of Lanzarote doubled in the years after the eruption, from about 5000 in 1730 to near 10 000 in 1768, predominantly as a result of the higher agricultural productivity. This outcome led to widespread use of lapilli and pumice fragments throughout the islands and eventually the rest of the globe. Lapilli and pumice provide vesicle space for moisture to be retained longer within the planting soil, which can create an environment for micro-bacteria to thrive in. Through this route, nutrients from volcanic matter are transported into the surrounding soil where they become available to plant life. The detailed processes that operate within the pyroclasts are less well understood, such as the breakdown of nutrients from the rock matrix and transport into the soil by biological action. Further studies promise significant potential to optimize future agricultural efforts, particularly in otherwise arid areas of the globe.