AgrobeNet : an agrochemical-microbe-plant network resource for enhancing soil health

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Soil-borne microorganisms are pivotal in sustaining soil health through their symbiotic relationships with plants as they provide essential benefits. However, the extensive use of agrochemicals, while boosting crop yields, often compromises soil health by diminishing microbial biodiversity. Understanding the effects of agrochemicals on soil microorganisms and their subsequent impact on plant health is vital. Yet our current knowledge is limited by descriptive research, a lack of insight into how changes in soil biota in turn affect plant health, and the absence of comprehensive databases. Here, we introduce AgrobeNet, a novel network resource designed to bridge these knowledge gaps by providing systematic, controlled data on the interactions among agrochemicals, microbes, and plants. Our findings demonstrate AgrobeNet's potential to elucidate the mechanistic impacts of agrochemicals on soil health, by leveraging graph theory algorithms and microbial genomics data. This approach not only deepens our understanding of the intricate soil ecosystem dynamics but also provides a foundation for developing strategies to mitigate the adverse effects of agrochemicals on soil biodiversity, thereby contributing to sustainable agriculture. AgrobeNet marks a significant advancement in systematically analysing and understanding the complex interplay between agrochemicals, soil microorganisms, and plant health.