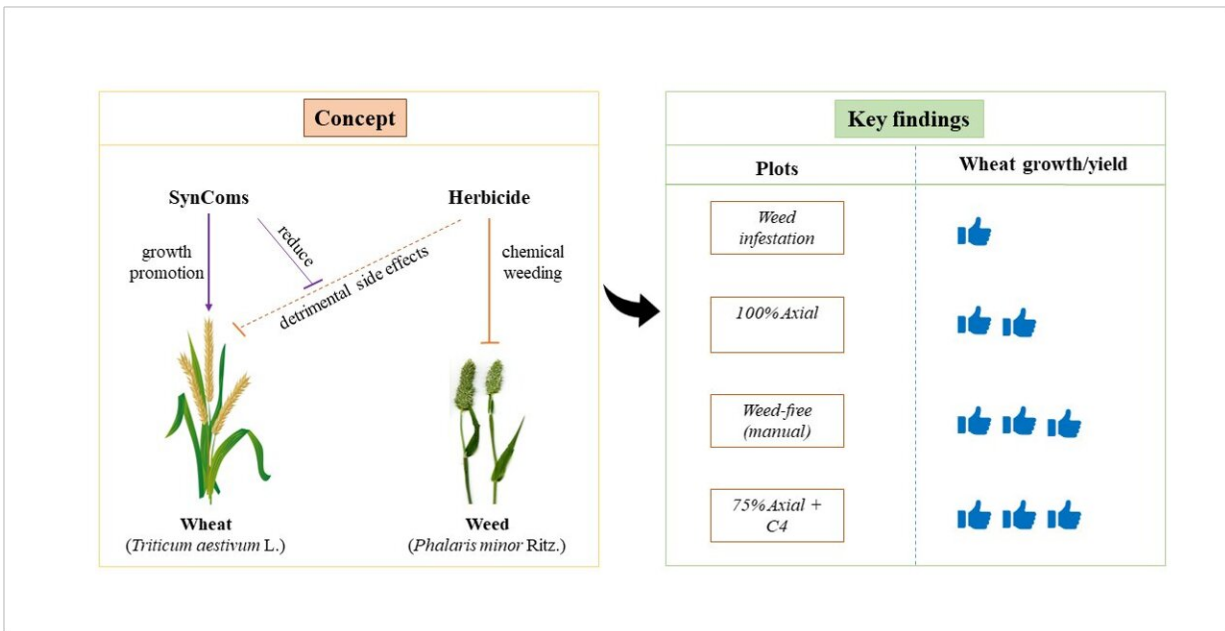# Field weed control: Synthetic microbial communities slash herbicide use

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Graphical abstract. Credit: Peng Cai's Lab

Synthetic microbial communities (SynComs) are emerging as powerful allies in the battle against weeds. These carefully crafted assemblies of microorganisms, such as compatible Pseudomonas strains, are designed to target specific weeds while promoting crop growth.

The application of herbicides with SynComs will be essential to understand their synergistic effects for controlling weed and promoting

[wheat](#) growth, so that provides a sustainable and eco-friendly weed control strategy. By harnessing the collective strength of Pseudomonas SynComs, this research brings us closer to reducing [herbicide](#) consumption significantly.

This approach thus promises a brighter, greener future for agriculture, where weeds are managed efficiently without the heavy use of chemicals. The researchers' [findings](#) appeared December 19, 2023 in *Soil Ecology Letters*.

Prof. Peng Cai's research team at the National Key Laboratory of Agriculture Microbiology, Huazhong Agriculture University, has unveiled a game-changing strategy for weed management that also boosts crop growth.

Under [greenhouse conditions](#), the team tested different SynComs, including C1, C2, C3, and C4, to assess their weed-suppressing potential. Among these, C4 emerged as the star performer, particularly when combined with a low-dose herbicide.

Remarkably, even without herbicide assistance, C4 significantly enhanced wheat growth. This finding underscores the pivotal role of beneficial rhizobacteria, which may reduce weed density and ensure robust crop yields through the production of various metabolites.

In extensive field trials, the C4 SynCom, coupled with 50% and 75% Axial herbicide, not only suppressed the growth and yield of the troublesome weed P. minor but also substantially strengthened infested wheat production. This synergy between rhizobacteria and wheat growth holds immense potential for more effective weed control.

There is a staggering impact of [weeds](#) on global grain yield, responsible for a substantial reduction worldwide—greater than any other pest. The

proliferation of weed seeds exacerbates problems year after year, leading to increased dockage, diminished crop grades, and escalating costs for seed cleaning and harvesting.

To address this critical issue, Prof. Peng Cai's team meticulously selected a field site plagued by persistent P. minor infestation spanning several years. This choice provided a clear canvas for understanding how the remarkable SynCom C4 can efficiently collaborate with a low-dose herbicide, offering an innovative solution for weed management and wheat crop enhancement.

They found that weed infestations are notorious for decimating grain yield, causing reductions of 16% and 25% at herbicide doses of 50% and 75%. However, when paired with C4, these herbicide doses experienced a remarkable reversal, rescuing 8% and 22% of the lost grain yield under weed-infested conditions, as compared to herbicide application alone.

These findings highlight the synergistic effects of combining herbicides with SynComs-an environmentally friendly strategy that not only effectively controls P. minor but also promotes robust wheat growth. This approach ushers in a new era of sustainable weed control and enhanced crop yields.

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