Bacterial Strains for Soybean Growth Enhancement

VTIP 21-084: “Bacterial Strains Show Unique Type of Plant Growth Support”

THE CHALLENGE

Soybeans are a major engine of U.S. agricultural exports. Due to the versatility of the crop and its ability to be integrated into a wide variety of products including protein and dairy alternatives, animal feed, biofuel, pharmaceuticals, and paints, the global soybean market is valued at approximately $150 billion and predicted to continue to grow for the coming decades. In the US alone, soybean based revenues are estimated to be $40 billion annually. As the human population expands, and land available for crop growth declines, soybean (and edamame) are excellent candidates for sustainable agriculture. The capacity to more efficiently utilize land for food production is a major challenge, that soybeans and probiotics can help to solve.

OUR SOLUTION

Mark Williams and his team at Virginia Tech have cultivated strains of Pseudomonas spp. that enhance levels of soybean growth up to two times that of untreated plants; treated plants exhibited greater above ground, root, and nodule mass growth. Greenhouse studies that were later expanded to field testing have confirmed the probiotic nature of the isolates. Greater root length is hypothesized to be one mechanisms whereby soybean growth is supported more strongly under field compared to greenhouse conditions. The strain(s) may thus be particularly useful in overcoming water deficit stress and drought conditions. Application of this bacterial isolate can help farmers save on fertilizer costs, which amount to 15-25% of costs per acre, and increase crop yield by an additional 10-20 bushels per acre. Additionally, use of bacteria rather than chemical fertilizers will increase soil organic matter and move nutrients into alternative forms that are more easily used by subsequent crops without the environmental costs associated with fertilizer run off.

A member of the Williams lab taking measurements in a soybean test field.

Soybeans cultured by the Williams Lab.

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