

process-it's built through a whole network that also involves plant hormones like ethylene, gibberellins, and abscisic acid, plus many working genes. New research in genomics and molecular biology is now finding more and more of these key genes and pathways, giving clues on how to manage nutrients more precisely in the future.

Smart fertilization methods-like giving a balanced mix of nutrients, applying them in stages, and using both organic and mineral fertilizers-can help pears grow bigger and taste sweeter. In practice, this means adjusting the right nutrient ratios, spraying leaves at key growth times, and using new genomic research to plan fertilizer use for each specific variety.

However, the shortcomings of reality cannot be ignored either. Many studies still remain at the level of a few varieties or general mechanisms, and the understanding of the differences among various pear varieties is not deep enough. In the fields, the situation is always more complicated: soil differences, climate fluctuations, and even pests and diseases can all alter the effectiveness of fertilization. This gap makes the achievements in the laboratory not always smoothly enter the orchard, and it also reminds us that future management strategies must be flexible and adapted to local conditions.

Next, a more promising direction is to truly integrate molecular and genomic data into nutrition management and build a smarter system. Genomic selection, marker-assisted breeding, and even real-time monitoring technologies can all be incorporated. The ultimate goal is not only to make pears larger and sweeter, but also to take into account the environment and sustainability. Precise fertilization, organic improvement, and the breeding of new varieties that efficiently utilize nutrients may enable the pear industry to strike a balance between economic benefits and ecological protection.

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Conflict of Interest Disclosure

The authors affirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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