

## Tiny tomato plants could be breakthrough crop for precision breeding and vertical farming

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A precision-bred tomato variety that produces up to 400% more fruit over one year than conventional tomatoes could be a breakthrough crop for precision breeding in the UK and a possible catalyst for a vertical farming boom.

Precision breeding company Phytoform Labs has developed the tomato, a miniaturised version of the elite variety Ailsa Craig, which can produce a kilogram of fruit from a plant one sixth of the typical size for tomatoes. The crop is tailored to the needs of vertical farms, where fresh produce is grown indoors under controlled conditions.

UK consumers eat around 500,000 tonnes of tomatoes each year and that number is rising. Just 70,000 tonnes are produced domestically, with most imported from the Mediterranean. There is a substantial opportunity for British growers to shorten the supply chain for this much-loved crop however, practicalities can get in the way.

Until now, vertical farms have tended to focus on leafy greens, which are small and require very low maintenance.

Typical growing heights in vertical farms are around 15-25 inches (approx. 40-60cm), meaning tomato plants, which can exceed that size in a month before producing fruit, have been considered impractical.

Some dwarf tomato varieties are available and have been widely used as a model in scientific research, but the flavour of the fruit has generally been unappealing. Faced with the lack of options for growers, and with few breeders working with dwarf varieties, Phytoform Labs, based at Rothamsted Research in Hertfordshire, stepped up to the challenge.

“With dwarf varieties, almost every single trait is bad, except for the size. Instead, we decided to make elite varieties into dwarfs, starting with something good and going from there – that’s how we came up with this vertical farming tomato,” says Dr Antony Chapman, the company’s lead tomato genome engineer.

As well as being tasty, the new variety also offers business benefits. The plants can fit in three growth cycles a year, compared to conventional tomatoes that only have a single cycle, and growers can fit between 50 and 100 plants in a single square metre, enabling them to produce 150-300kg/m<sup>2</sup> – up to a 400% increase on conventional varieties.

Vertical farming company Harvest London, which has two farming facilities in Walthamstow and Leyton, has just completed the first phase of a pre-commercial trial using the variety. It has successfully grown hundreds of plants and is now working to optimise growing approaches.