

Case study: the ideal amaranth plant

We asked participants from our urban growing sites to select the characteristics they would consider to be part of an ideal amaranth plant. Amaranth is used in many different countries in different ways, so one person's ideal may be very different from another.

Which parts of the crop do people use?

Amaranth produces edible leaves, stems and seeds. Different parts are used in different countries – we didn't find many countries that used everything!

Leaves

The leaves are frequently used in a similar way to spinach, although they have a slightly different taste. This was the most popular part of the plant to be used, and they were used in many ways by different countries. The leaves are higher in protein than most other leafy crops, containing one to four per cent fresh weight. They contain lysine, an amino acid often lacking in plant-based foods.¹



Up to 15 participants used the leaves including those from Iran, Kurdistan, Pakistan, UK, Bangladesh, Cameroon, Jamaica and Greece. Here are some of their uses:

Jamaica: *"We use the leaves stir fried with chilli and coconut"*

Bangladesh: *"Leaves are used either in a dry curry dish or with a rich sauce"*

Cameroon: *"We flavour the leaves with tomato and garlic"*

Greece: *"We serve the leaves with lemon in a salad"*

Pakistan: *"We dry the leaves, and they are sold for medicinal purposes at markets"*

Stem

The stems are only used by some cultures as they tend to be tough, so are suitable for cooking down in a curry. In Bangladesh, they even favour varieties with fat stems, which they call 'dugi'.

Up to four participants used the stems, including those from Bangladesh, Cameroon, Greece and Jamaica.

The conditions under which the plants are grown are important and one participant from Jamaica stated their preference:

"Most of the goodness of the plant is in the stem, but we only use the stems from rapidly growing tender plants grown in fertile soil"

¹ Prakash, Dhan, and M. Pal. "Nutritional and antinutritional composition of vegetable and grain amaranth leaves." *Journal of the Science of Food and Agriculture* 57.4 (1991): 573-583.

Seeds

Seeds of amaranth are just a few millimetres in diameter and may be black, red or white. Some are high in tannins so have a bitter taste. The seeds can be used as a grain as an alternative to rice and are a better source of protein than wheat or rice.²

Up to four participants used the seeds including those from Afghanistan, Argentina, UK and Iran.



Iran: "We collect the seeds and use them sprinkled onto a soup. We don't eat the leaves"

Jamaica: "We only eat the leaves, we never use the seeds except to grow plants for next year"

What features do people look for in a plant?

Time of flowering



A greater number of participants favoured varieties that flowered later as the plant will continue to produce leaves for longer. A Jamaican participant noted that the quality of the leaves was best before the plant started to flower.

In Iran, it's predominantly the seeds that are used, so earlier flowering would be favoured. As in the UK, amaranth is also grown as a garden ornamental, so early flowering would be preferred for aesthetic reasons.

Preferences for timing of flowering:

Early flowering: eight participants from Afghanistan, Antigua, St Kitts, UK, Iran and Kurdistan.

Late flowering: 13 participants from Antigua, Bangladesh, Cameroon, Congo, Greece, Kurdistan, Pakistan and the UK.

² Písaříková, B., S. Kráčmar, and I. Herzig. "Amino acid contents and biological value of protein in various amaranth species." *Czech Journal of Animal Science* 50, no. 4 (2005): 169-174.

Leaf size

Many cultures favour larger leaves, especially Jamaica, many of the varieties are larger leaved, whereas many of the Indian/Bangladeshi varieties are smaller leaved. Sometimes, opinions from the same region differed: one participant from Congo said they preferred larger leaves whereas another expressed a preference for smaller leaves, saying that they tasted better.

Preferences for size of leaves:

Large leaves: favoured by 11 participants from Afghanistan, Antigua, St Kitts, Bangladesh, Cameroon, Congo and the UK.

Medium leaves: favoured by nine participants from Argentina, Greece, Iran, Kurdistan, Pakistan and the UK.

Small leaves: were favoured by three participants from Kurdistan and Iran.

Leaf colour



Many cultures have developed varieties with distinct leaf colours. The colour is an important influence of the nutritional content, with red leaves shown to be higher in antioxidants³.

Pale green leaves: favoured by Jamaican growers and this was evident in many of the varieties that we see grown on allotments.

Darker green varieties: favoured by Bangladeshi communities but they also grow many other different coloured varieties.

Where plants were grown as ornamentals: in Iran and the UK, a range of coloured leaves including pinks and purples were more important. One Iranian participant also believed that the red coloured plants were more likely to produce seeds more quickly, which was the main motivation for growing this plant.

Preferences for leaf colour:

- | | | |
|---------------|----|---|
| • Dark Green | 13 | Antigua, Bangladesh, Cameroon, Congo, Iran, Kurdistan, UK |
| • Light Green | 8 | Afghanistan, Greece, Iran, Jamaica, Kurdistan, Pakistan, UK |
| • Purple | 3 | Argentina, UK |
| • Red | 1 | Iran |

³ Sarker, Umakanta, and Shinya Oba. "Antioxidant constituents of three selected red and green color Amaranthus leafy vegetable." *Scientific reports* 9.1 (2019): 18233.