**Table S1. Diversity of some important traditional food crops grown across the globe and their nutritional and stress-resilient traits desirable for sustainable food security under climate change regimes.**

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| **Sl. No.** | **Traditional food crop** | **Occurrence and traditional use** | **Important nutritional and stress resilient traits** |
| 1 | *Lolium perenne* (Perennial ryegrass; Poaceae) | Used as a cereal in North America, Southern countries of Europe, North Africa Middle East, and towards the eastern sides of Central Asia (Schnyder et al., 1990). | The seed has a nutritional value similar to oats (*Avena sativa*) and contains gluten which is an important trait of baked food (Schnyder et al., 1990). |
| 2 | *Cleome gynandra* (Stinkweed, Capparaceae) | It is an important vegetable in rural areas of several African countries (Mishra et al., 2011). | Plenty in linoleic acid. Rich in amino acids such as glutamic acid, aspartic acid, arginine, tyrosine, histidine and lysine (Mishra et al., 2011). C4 photosynthetic pathway helps them to survive in dry and hot conditions (Rao & Rajendrudu, 1989). Adapted to several types of soils and can grow in humid, semiarid and arid climates (Kumar et al., 1984). |
| 3 | *Basella alba* (Vine spinach, Basellaceae) | Used throughout the temperate regions and the tropics (Bamidele et al., 2010). | Leaves are rich in calcium, fibre, fat, protein and carbohydrates (Adhikari et al. 2012). They are extremely heat tolerant and are also adapted to a variety of soils and climates (Deshmukh & Gaikwad, 2014). |
| 4 | *Vigna subterranea* (Bambara groundnut, Fabaceae) | It has been an important indegenous crop in African countries such as Sahara, South Africa, Senegal, Kenya and Madagascar (Murevanhema and Jideani, 2013). | Drought and pest resistant, able to survive in poor soils. Rich in protein whereas fat content is less (Adebowale et al., [2002](https://www.tandfonline.com/doi/full/10.1080/10408398.2011.574803?casa_token=3QaPEKppwX8AAAAA%3AhYx-CO1Sa6gqn2v9isrJB7zoHfjJHy8d6IT4gbbk9TrXyG95E20R2syhwXkGrGHM_HdH2aviidbm5IRk)). Rich in essential sulfur containing amino acids such as Methionine and provides a good amount of fibre, iron, potassium, and calcium (Omoikhoje, [2008](https://www.tandfonline.com/doi/full/10.1080/10408398.2011.574803?casa_token=3QaPEKppwX8AAAAA%3AhYx-CO1Sa6gqn2v9isrJB7zoHfjJHy8d6IT4gbbk9TrXyG95E20R2syhwXkGrGHM_HdH2aviidbm5IRk)). |
| 5 | *Chlorophytum comosum* (spider plant, Asparagaceae) | Iran (Aberoumand et al., 2009). | Tubers are rich in carbohydrates, fibre and calcium (Aberoumand et al., 2009). |
| 6 | *Corchorus* spp. (Mallow, Malvaceae) | In India, Africa, and the Middle East, it has been a popular vegetable since ancient times (Schippers, 2000). It is also famous in some Arab countries such as Syria, Jordan and Egypt (Islam, 2013). | The leaves are a good source of calcium, iron, beta carotene, vitamin C, and α-tocopherol. Plant show antioxidant activity also (Islam, 2013). |
| 7 | *Macrotyloma uniflorum* (Horse gram, Fabaceae) | Cultivated in Asian countries specially India to Myanmar and African countries (Bhartiya et al., 2015). | Adapted to drought and poor fertile solid conditions. A potential source of nutrients such as protein. Iron and calcium (Bhartiya et al., 2015). |
| 8 | *Fagopyrum tataricum*, *F. esculentum* (Buckwheat, Polygonaceae) | Found on a large scale in Asian and Southeast Asian countries. It was spread from China to Japan and Korea, It is also consumed in Russia, Sweden, Europe and North America (Campbell, 1997). | Proteins are rich in essential amino acid lysine (Campbell, 1997). |
| 9 | *Brassica carinata* (Ethiopian mustard, Brassicaceae) | Consumed all over the world and are considered important food crops in European countries, India, Japan, and China (Cartea et al., 2011). It is an important green leafy vegetable in Zambia and in most parts of tropical Africa (Grubben, 1977). | They have high levels of glutamic acid, arginine and proline (Cartea et al., 2011). |
| 10 | *Colocasia esculenta* (Taro, Araceae) | It is found all over the Pacific islands and other parts of the world. Africa is the bulk producer of taro, followed by Asia and Oceania (Temesgen & Retta, 2015). | Rich in small starch grains and proteins. Nutritive than other tubers and rich in vitamins (thiamine, vitamin C, niacin and riboflavin), minerals (iron, phosphorus and calcium). Taro corms have a high quantity of magnesium and potassium. Also a good source of carotene (Kaushal et al., 2015). |
| 11 | *Boscia senegalensis*  (Aizen plant, Capparaceae) | Native to Sahel region of Africa (Habou et al., 2014). | Protein contains a considerable quantity of tryptophan and arginine. Zinc and iron present at a relatively high level (Kim et al., 1997). High degree of drought resistance (FAO/WHO, 1988). It can perform very well even in poorer land conditions (Habou et al., 2014). |
| 12 | *Sphenostylis stenocarpa*  (African yam bean, Fabaceae ) | Cultivated in the different regions of African countries (Daniel & Celestina, 2013). | The legume and tuber of the plant is edible. Adapted to wide range of climatic, geographical, and edaphic conditions  (Daniel and Celestina, 2013). They have a short growing period (Adegboyega et al., 2020). |
| 13 | *Telfairia occidentalis* (Fluted guard, Cucurbitaceae) | The crop is extensively cultivated in southern Nigeria (Okoli and Mgbeogu, 1983). | Leafy vegetable with oil rich leaves. Its nutritious seeds are also consumed as they are a good source of minerals and proteins (Okoli and Mgbeogu, 1983) |
| 14 | *Digitaria exilis*  (Fonio millet, Poaceae) | Cultivated throughout West Africa (Glew et al., 2013). | Rich in minerals, vitamins, carbohydrate, protein, fibre. It is rich in iron. Another advantage is that it is gluten free (Istifanus & Agbo, 2016). Grows in poor fertile soil and rain deficient areas ([Jideani, 1999](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4666555/#R30). Long storage life without preservatives (Glew et al., 2013). |
| 15 | *Crotalaria brevidens* (Rattle pod, fabaceae) | Widely consumed and cultivated in East Africa and West Africa  (Abukutsa-Onyango, 2016). | Good source of β-carotene, ascorbate, folic acid, riboflavin, iron, calcium and magnesium (Maundu et al., 1999; Abukutsa-Onyango, 2003). They have nitrogen fixing capacity, drought tolerance, produce seeds under tropical conditions and suitable for intercropping (Abukutsa-Onyango, 2004). |
| 16 | *Dacryodes edulis*  (African pear, Burseraceae) | Cultivated in Guinea and widely in other tropical parts of Africa (Ajibesin, 2011). | Edible fruits contain lipid, protein, vitamin and minerals such as potassium, calcium, magnesium, iron, zinc, copper and selenium (Ajibesin, 2011; Stadlmayr et al., 2012; Ene-Obong et al., 2019). |
| 17 | *Treculia africana* (African breadfruit, Moraceae) | Cultivated in Nigeria and Africa as a whole (Nuga & Ofodile, 2010). | Seeds are highly nutritious because of the presence of minerals such as potassium, magnesium and calcium, vitamins, fats, proteins, and carbohydrates (Okafor and Okolo, 1974). Grows in marginal areas where other species may not be able to grow (Nuga & Ofodile, 2010). |
| 18 | *Momordica balsamina* (Balsam apple, Cucurbitaceae) | Indegenous to the countries of tropical Africa, Arabia, Asia and Australia. Widely distributed in Swaziland Namibia, Botswana and the provinces of SouthAfrica (Thakur et al., 2009). | Leaves are rich in protein and fat. They have higher values of minerals such as calcium, magnesium and iron (Flyman & Afolayan, 2007). Leaves also contain 17 amino acids (Thakur et al., 2009). |
| 19 | *Adansonia digitata* (Baobab, Malvaceae) | Distributed throughout the drier parts of Africa, Namibia, Ethiopia, Sudan and Sahara (Gebauer et al., 2002). | Contains vitamin B2/Riboflavin, calcium, phosphorus, iron, vitamin A and vitamin C. It contains almost 10 times more vitamin C than oranges (Sididbe et al., 1998; Yazzie et al., 1994).  It is drought tolerant and can tolerate various ranges of pH. It can also grow in calcareous soils and rocky hillsides (Gebauer et al., 2002). |
| 20 | *Berchemia discolour* (Bird plum, Rhamnaceae) | Indigenous Southern African fruit tree species.  Widely distributed in the regions of northern, eastern, central and southern Africa (Lusepani, 1999). | The dry pulp is a rich source of calcium, carbohydrates, iron, sodium, potassium, and magnesium (Lusepani, 1999). |
| 21 | *Heinsia crinita* (Bush apple, Rubiaceae) | Indigenous to West Africa, especially the southern part of Nigeria (Udosen et al., 1999). | Rich in calcium, magnesium, potassium, iron and zinc (Udosen et al., 1999). |
| 22 | *Psophocarpus tetragonolobus* **(**Winged beans, fabaceae) | Widely grows in Malaysia, Indonesia, the Philippines, Bangladesh, Thailand, Sri Lanka, India, Myanmar and African countries (Lepcha et al., 2017). | Seeds, pods, tubers, foliage and flowers are nutritious (Lepcha et al., 2017) and contain higher crude protein (Amoo et al., 2006). It has adequate quantity of minerals such as P, K, Ca, S, Na, Mg, Mn, Fe, B, Sr, Zn, Ba, Cu and Cr, and vitamins such as vitamin A, vitamin B1, vitamin B2, vitamin B3, vitamin B6, vitamin B9, vitamin C and vitamin E (Misra et al., 1987).  It is suitable to be grown in hot, humid conditions and possess nitrogen fixation capacity (Jaffe & Korte, 1976). |
| 23 | *Tropaeolum tuberosum* (Mashua, Tropaeolaceae) | Traditional subsistence tuber crops indigenous to the Andean highlands (Ticona et al., 2020). | It can be grown in poor soils without pesticides and fertilizers (Ticona et al., 2020). They have a high level of protein with an ideal balance of essential amino acids. More content of vitamin C and provitamin A (equivalents of Retinol) than other Andean tubers. Magnesium, phosphorus, iron, and zinc rich (Altamirano, 1996). |
| 24 | *Oxalis tuberosa* (Oca, Oxalidaceae) | Second important tuber crop in Bolivia and Peru. Cultivated as an important crop in Central Andes, Chile, Argentina, Ecuador, Bolivia and Peru (Jimenez et al., 2015). | Iron and calcium rich tubers (Flores et al., 2003). Notable quantity of fructo-oligosaccharides reported (Jimenez & Sammán, 2014). |
| 25 | *Smallanthus sonchifolius* (Yacon Asteraceae) | Cultivated in Bolívia, Peru, Czech Republic, Argentina, Italy, Brazil, Ecuador, Korea, Japan, New Zealand, and the United States (Ojansivu et al., 2011). | Rich in fructooligosaccharides that are good for colon health. They are extremely hardy plants and adapted to cold and hot conditions (Lachman et al., 2003). |
| 26 | *Chenopodium pallidicaule* (Cañiwa, Amaranthaceae) | Majorly grown in Bolivian and Peruvian *altiplano* (Repo-Carrasco-Valencia et al., 2009)*.* | Exceptional protein quantity and quality and grains are enriched with micronutrients such as calcium and iron (Repo-Carrasco-Valencia et al., 2009). The nutritional value is equivalent to milk proteins (White et al., 1955). Gross et al. (1989) recognised that it has a balanced amino acid composition and 15.3% protein content. It doesn't have saponins, that gives bitter taste and hence it is possible to consume directly without washing. Drought and frost resistant plants, well adapted to rocky and poor nutrient soil..   (Repo-Carrasco-Valencia et al., 2009). |
| 27 | *Lablab purpureus* (Hyacinth bean, Fabaceae) | Third high priority vegetable in the south-western and central region of Bangladesh (Maass et al., 2020). Cultivated as a minor crop in tropical regions of Asia and Africa (Engle & Altoveris, 2000). | Extremely resilient to drought-prone areas. A good source of vegetable protein and also a potent source of fats,carbohydrates, fibers and minerals also (phosphorus, calcium, iron) (Naeem et al., 2020). |
| 28 | *Sclerocarya birrea* (Marula, Anacardiaceae( | African fruit tree (Mariod & Abdelwahab, 2012). | Seeds contain sufficient amounts of calcium, phosphorus, magnesium, iron, potassium, and copper. Seed edible part has 36.4% of protein, with high levels of cysteine and methionine. Fruits are rich in ascorbic acid and juice extracts contain 33 types of sesquiterpene hydrocarbons (Mariod & Abdelwahab, 2012). |
| 29 | *Amorphophallus paeoniifolius* (Elephant foot yam, Araceae) | Cultivated in Southeast Asian countries such as Malasia, Philippines and Indonesia. (Behera et al., 2014). | Multiple edible parts such as leaves, rhizome, and petioles. Immunity booster and rich in carbohydrates, phenols, alkaloids, tannins, flavones, steroids, coumarins, vitamins, minerals, and antioxidants (Tripathi et al., 2010; Behera et al., 2014). |
| 30 | *Solanum quitoense* (Lulo, Solanaceae) | Majorly cultivated and consumed in Columbia, Ecuador and Central America (Acosta et al., 2009). | Carotenoid content of fruit is high. Very low fat content but rich in proteins ( Acosta et al., 2009). |
| 31 | *Senna tora* (Sickle pod, Caesalpiniaceae) | India (Kubmarawa et al.,2011) | Its leaves consist of lipids, crude fibre, crude protein, mineralas (iron, calcium, cobalt sodium, zinc, magnesium, manganese, and potassium) (Kubmarawa et al.,2011). Sickle pods hold great potential as a source of medicine, minerals. They exhibit drought tolerance  (Shukla et al., 2013). |
| 32 | *Ziziphus jujuba* (Buckthorns, Rhamnaceae) | Widely distributed in Europe, Southern and Eastern Asia, and Australia. China is the only country known to be exporting jujube fruits (Li et al., 2007). | They  grow in different soils and are resistant to alkalinity and salinity, and better adapted to arid regions. They contain high amounts of fructose and fibre. Jujube fruit is rich in unsaturated fatty acids. Fruits are rich in lipids, especially linoleic acid (omega-6). They are rich in vitamin C also. Excellent source of magnesium, phosphorus, potassium, sodium, and zinc (Li et al., 2007; Guil-Guerrero et al., 2004). |
| 33 | *Pyrus pyrifolia* (Asian pear, Rosaceae) | It is cultivated throughout Central and South China, Russia, Korea, Japan, Vietnam, Thailand and India, Indonesia and Philippines. Recently, it is also cultivated in Australia, New Zealand and USA and Europe (Italy, France) (Lim, 2012). | Abundant vitamin B and minerals (Lim, 2012). |
| 34 | *Sclerocarya birrea* (Marula, Anacardiaceae) | Western Africa (Glew et al., 2004). | Rich in linoleic acid and oleic acid. Highest quantities of arginine than any other plant protein. zinc, magnesium and copper are comparatively higher (Glew et al., 2004). |
| 35 | *Setaria italica* (Foxtail millet, Poaceae) | China, India and other Asian countries (Shen et al., 2015) | Great tolerance to drought and can grow in arid and barren lands (Shen et al., 2015). |
| 36 | *Grewia asiatica* (Phalsa, Malvaceae) | Tropical and sub-tropical parts of South Asia including Cambodia, 58 Luzon region of the Philippines, Laos, northern  (Yadav, 1999). | Low in calories and fat, and high in vitamin A, vitamin C, minerals, and fiber. Gives better yields under limited water conditions with temperatures ranging between 35 degree Celsius to 45 degree celsius (Khan et al., 2019). |
| 37 | *Aegle marmelos* (Bael, Rutaceae) | Cultivated throughout India (Bhardwaj, 2014). | Potent source of vitamins (A, B, C, folate) and minerals, antioxidants, dietary fibre, amino acids and bioactive compounds (Bhardwaj, 2014). They are adapted to high salinity conditions  (Singh et al., 2018). |
| 38 | *Carissa carandas* (Koranda, Apocynaceae) | India (Jayakumar &  Muthuraman, 2018). | Rich source of vitamin C, iron, calcium and phosphorus (Jayakumar &  Muthuraman, 2018). They are xerophytic and suitable for growing in dry land (Dalal et al., 2010). |
| 39 | *Artocarpus heterophyllus* (Jackfruit, Moraceae) | Majorly cultivated in tropical regions of Burma, Sri Lanka, Indonesia, Malaysia, Jamaica, India, Mauritius, Brazil, East Africa, the Seychelles, and Rodrigues Island (Rodrigues et al., 2010). | Fruits are rich in carbohydrate and vitamins (A & C) and folic acid. Rich in calcium and magnesium (Ranasinghe et al., 2019). Tolerant to water deficit conditions  (Rodrigues et al., 2010). |
| 40 | *Ullucus tuberosus* (Olluco, Basellaceae) | Peru, Ecuador, Colombia, Venezuela and northwestern Argentina (Busch et al., 2000). | Frost and drought‐resistant and  gives good yield in poor soils. Lower in fat than corn (Busch et al., 2000). |
| 41 | *Arracacia xanthorrhiza* (Arracacha, Apiaceae) | It is found in South American Countries such as Ecuador, Colombia, Brazil, and Venezuela (Lim, 2014). | Adapted to mesothermic, montane, day length regimes and tropical frost-free conditions (Lim, 2014). |
| 42 | *Morinda citrifolia;*  *(*Indian mulberry; Rubiaceae) | Native to Southeast Asia and Australia and widely distributed globally (Nelson, 2003). | Vitamins such as ascorbic acid and provitamin A, amino acids such as aspartic acid, mineral and an alkaloid,  xeronine  is detected in its fruits (Chan-Blanco etal., 2006).  The plant shows tolerance to a number of stresses such as drought, water logging and salinity (Nelson, 2003). |
| 43 | *Canavalia gladiata*  (Sword bean; Leguminosae) | They are cultivated on a limited scale in Asia, West Indies, Africa and South America (Ekanayake et al.,2000). | Seed coat of the sword bean is rich in gallic acid and other derivatives (Popoola et al., 2019). Seeds are a rich source of sodium, potassium and calcium (Mohan and Janardhanan, 1994). The crude protein content of sword beans is high. Some cultivars are fairly resistant to drought (Ekanayake et al.*,* 2000). |
| 44 | *Lupinus mutabilis*  (Tarwi; Leguminosae) | Distributed widely in the Andes, Venezuela, Colombia, Ecuador, Peru and Bolivia, Australia, Germany, New Zealand, Poland and the United Kingdom (Eastwood & Hughes, 2018). | Seeds have high protein and lipid, content whereas fiber and carbohydrate content is lower as compared to other lupin species (Carvajal-Larenas et al., 2016). It has adaptability to temperate and cold climates. It can grow on marginal land and low fertility soils ([Gulisano](https://www.ncbi.nlm.nih.gov/pubmed/?term=Gulisano%20A%5BAuthor%5D&cauthor=true&cauthor_uid=31737013) etal.*,* 2019). |
| 45 | *Limonia acidissima* (Wood Apple; Rutaceae) | Native to India but also cultivated in Bangladesh, Pakistan and Srilanka (Vijayvargia & Vijayvergia, 2014) | The fruits are rich in β-carotene, vitamin B, vitamin C, thiamin and riboflavin. Fruit pulp is enriched with citric acid, other fruit acids, mucilage and minerals. Other compounds such as alkaloids, coumarins, fatty acids and sterols are also detected in its fruits (Vijayvargia and Vijayvergia, 2014). It is well adapted to drier conditions thus shows a greater stress tolerance (Ratnayake et al., 2020.). |
| 46 | *Cordia myxa*  (Indian Cherry:  Boraginaceae) | It is found globally especially in the tropics. It grows naturally in India, Myanmar and Afghanistan (Meghwal & Singh, 2015). | Fruits contain good quantities of sodium, potassium and protein (Aberoumand, 2011). It display drought tolerance and because of that it can easily grow in arid and semi-arid regions (Meghwal & Singh, 2015). |
| 47 | *Carissa carandas*  (Karonda; Apocyanaceae) | The plant is distributed in various parts of the world such as Nepal, Afghanistan, India, Sri Lanka, Java, Malaysia, Myanmar, Pakistan, Australia, and South Africa (Singh & Uppal, 2015). | Fruits are rich in calcium, iron, vitamin C, vitamin A (Arif et al., 2016). The plant shows drought tolerance (Singh & Uppal, 2015). |
| 48 | *Lepidium meyenii* (Maca, Brassicaceae) | Nutritionally highly valuable and is native to Peru (Muhammad et al.*,* 2002). | It contains good quantities of fiber, essential amino acids, fatty acids, vitamin C and minerals such as copper, iron, and calcium (Peres et al., 2020). |
| 49 | *Pastinaca sativa* (Parsnips, Apiaceae) | It is commonly found in old fields, roadsides and woodland edges in North America (Lim, 2015). | Rich in vitamins and minerals particularly rich in potassium (Lim, 2015). It shows drought tolerance (Tutin, 1980). |
| 50 | *Xanthosoma sagittifolium* (American taro, Araceae) | Traditionally used tuber crop, native to Nigeria and tropical Africa (Adebowale & Lawal, 2002). | Good source of carbohydrates and starch. Superior nutritional in terms of their protein digestibility and mineral composition such as calcium, phosphorus and magnesium) (Chukwu et al., 2018). |
| 51 | *Colocasia antiquorum* (Taro, Araceae) | Widely consumed throughout the world especially Africa, Asia, the West Indies, and South America (Miller, 1971). | The corms are rich in anthocyanins such as cyanidin-3-glucoside, pelargonidin-3-glucoside and cyanidin-3-rhamnoside (Miller, 1971). They are salt tolerant (Nyman et al., 1983). |
| 52 | *Nelumbo nucifera* (Lotus, Nymphaeaceae) | Creeping rhizome found throughout India. Also found in China and Japan (Rai etal*.,* 2006). | Seed is a good source of protein and total carbohydrate and possesses high calorific value. It also contains higher quantities of essential minerals such as Na, K, Mg, Fe, Co, Zn and P (Shad et al., 2013). They exhibit flooding tolerance (Nohara & Kimura, 1997). |
| 53 | *Plectranthus rotundifolius* (Spreng, Lamiaceae) | Eaten for its edible tubers, native to tropical Africa.Grown in Africa and SouthEast Asia (Manikandan et al., 2016). | It contains higher mineral content as compared to potato, sweet potato and cassava (Sethuraman et al., 2020). Highly tolerant to drought (Priya & Anbuselvi, 2013). |
| 54 | *Triticum monococcum* (Einkorn wheat, Poaceae) | It is an ancient staple food crop for many years. However, it is presently cultivated only in the Mediterranean region and continental Europe (Hidalgo & Brandolini, 2013). | Not very good in dietary fiber but it contains good amounts of proteins, unsaturated fatty acids, zinc and iron. It contains antioxidant compounds such as carotenoids, tocols and conjugated polyphenols, (Hidalgo and Brandolini, 2013). They exhibit salinity and frost tolerance (Prazak 2001). |
| 55 | *Triticum dicoccon* (Emmer wheat, poaceae) | Used as cereal crop in Middle- East, Central and West Asia, and Europe (Dhanavath & Rao, 2017). | Rich in proteins, carbohydrates, minerals, and poor in fats (Dhanavath & Rao, 2017). Shows drought tolerance (Nouri et al., 2011). |
| 56 | *T. spelta* (Dinkel wheat, Poaceae) | It has been an important staple food in parts of Europe in the ancient past (Kohajdova & Karovicova, 2008). | High vitamin content (Kohajdova & Karovicova, 2008) and rich source of iron, zinc, copper, magnesium, potassium, sodium and selenium (Ruibal-Mendieta et al., 2005). They have high flooding tolerance (Burgos et al., 2001). |
| 57 | *Eleusine coracana* (Finger millet, Poaceae) | It is produced in India, Niger, Mali, Burkina Faso, Chad and China (Chandra et al., 2016). | It is rich in calcium, dietary fibre, phylates, protein, minerals, and phenolics. It is also a rich source of vitamins such as thiamine and riboflavin. It contains a good quantity of iron, methionine, isoleucine, leucine, phenylalanine and other essential amino acids (Chandra et al., 2016). They are tolerant to drought, pests and pathogens (Hittalmani et al., 2017). |
| 58 | *Panicum sumatrense* (Little millet, poaceae) | Found in the [Caucasus](https://en.wikipedia.org/wiki/Caucasus), [China](https://en.wikipedia.org/wiki/China), [India](https://en.wikipedia.org/wiki/India) and [Malaysia](https://en.wikipedia.org/wiki/Malaysia) (Devi et al., 2011). | Rich in micronutrients such as calcium and iron. They also contain high dietary fibre content, essential amino acids, and have low glycaemic index (Devi et al., 2011). It also shows considerable tolerance against drought, salinity stresses and diseases. |
| 59 | *Panicum miliaceum* (Proso millet, poaceae) | Produced in China, Russia, India and some countries of Eastern Europe and North America (Kalinova. 2007). | The protein content is richer in essential amino acids such as leucine, isoleucine, and methionine than wheat (Kalinova & Moundry, 2006). They are drought tolerant (Zhang et al., 2019). |
| 60 | *Pennisetum glaucum* (Pearl millet, poaceae) | Pearl millet is an important cereal and it is well adapted to arid and semiarid regions of Asia and Africa (Jukanti et al., (2016). | It has high levels of calcium, iron, zinc, lipids and amino acids such as lysine, tryptophan, threonine and fatty acids such as omega-9, omega-6 and omega-3. The tannins and phytates act as strong antioxidants (Sade, 2009; Onyango et al., 2013). It has a low glycemic index and it is gluten free crop. They are extremely drought tolerant crops (Newman et al., 2010). |
| 61 | *Brosimum alicastrum* (Breadnut, Moraceae) | Grown in southern Mexico (Rzedowski, 1978). | The flour obtained from the seeds is characterized by high protein, dietary fiber and micronutrient content. They are drought tolerant (Cueto et al., 2019). |
| 62 | *Artocarpus altilis* (Breadfruit, Moraceae) | It is an important food in the Pacific (Taylor & Tuia, 2007). | Rich in fibre, protein, magnesium, potassium, phosphorus, thiamine (B1), and niacin (B3). They have tolerance to salinity and can grow on coralline soils and atolls (Tukura & Obliva, 2015). |
| 63 | *Artocarpus heterophyllus* (Jackfruit, moraceae) | Widely grown in Bangladesh, Malaysia, Burma, Sri Lanka, Indonesia, Philippines, Caribbean islands, West Africa, Australia, some parts of USA and Brazil (Narasimham, 1990). | Jackfruit is rich in health beneficial compounds such as carotenoids, flavonoids, volatile acids, sterols and tannins (Chandrika et al., 2004; Arung et al., 2007). It is rich in fibre, sugars, minerals such as calcium, magnesium, phosphorus, potassium, sodium, iron and vitamins such as vitamin A, thiamine, riboflavin, vitamin C (Ranasinghe et al., 2018). |
| 64 | *Pachira aquatica*  (Malabar Chestnut; Bombacaceae) | Native to Southern Mexico, Guyana and Northeastern Brazil and introduced in other areas such as Guangdong, Southern Yunnan, and Taiwan as a cultivated plant (Rodrigues et al., 2019). | Seeds contain a high amount of lipids, proteins with high amounts of essential amino acids such as tryptophan, threonine and phenylalanine/tyrosine (Oliveira et al., 2000). Seeds contain more phosphate, magnesium, zinc, iron and copper than some fruits and other starchy foods (Rodrigues et al., 2019). |
| 65 | *Strychnos cocculoides*  (Monkey orange; Loganiaceae) | The species is native to Botswana, Kenya, Namibia, South Africa, Tanzania, Uganda, Zambia, Zimbabwe (Orwa et al., 2009). | Adapted to drought prone and semi-arid areas. The vitamin C content of the fruits varies from 34.2 mg/100 g to 88 mg/100 g. Considered an essential source of iron (Ngadze et al., 2017). |

**Table S2: Major domestication traits and the genes governing them in important crop plants (Modified from Meyer** and **Purugganan, 2013).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Domesticated crop**| **related traditional crop (s)** | **Gene** | **Wild trait** | **Domestication trait** | **Function of the gene** | **Reference (s)** |
| *Fragaria vesca* | *Pyrus pyrifolia, Rubus fruticosus, R. spectabilis, R. occidentalis* (Soundararajan et al., 2019) | *TERMINAL FLOWER 1 Homologue KSN* (*TFL1*) | Non-frequent flowering. | Continuous flowering. | Flowering repression. Establishment of continuous flowering habit. | [Iwata et al., 2012](https://www.cell.com/molecular-plant/fulltext/S1674-2052(15)00094-5); [Koskela et al., 2012](https://www.cell.com/molecular-plant/fulltext/S1674-2052(15)00094-5); Meyer & Purugganan, 2013 |
| *Hordeum vulgare | Hordeum murinum* (Ferchichi et al., 2018), [*Hordeum brachyantherum*](http://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=52712&lvl=3&lin=f&keep=1&srchmode=1&unlock), [*Hordeum jubatum*](http://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Tree&id=4517&lvl=3&lin=f&keep=1&srchmode=1&unlock) (von Bothmer et al., 1995) | *nud* (*nud*) | Palea and lemma hulls are tightly adhered to the caryopsis which results in hulled seeds. | Reduced organ adhesion between the caryopsis and the hull. | Controls caryopsis and is involved in the lipid biosynthesis pathway. | Yu et al., 2016; Meyer & Purugganan, 2013 |
| *SIX-ROWED SPIKE*  *1* (*VRS1*) | Two rawed inflorescence. | Change of inflorescence architecture from two-rowed to six-rowed spikelet. | Loss of function of Vrs1 results in the conversion of the rudimentary lateral two-rowed spikelet in barley into a fully developed six rowed fertile spikelet. | Meyer & Purugganan, 2013; Komatsuda et al., 2007 |
| *Photoperiod-H1* (*Ppd-H1*) | Early flowering. | Delayed flowering time. | Candidate gene for leaf size and flowering time in the barley population. | Meyer & Purugganan, 2013; Digel et al., 2016 |
| *RESISTANT TO RALSTONIA SOLANACEARUM 2* (*RRS2*) | Low leaf scald resistance. | Increased leaf scald resistance. | Resistance gene to fungal pathogen *Rhynchosporium secalis* which causes leaf scald disease. | Meyer & Purugganan, 2013; Genger et al., 2003 |
| *EARLY FLOWERING3* (*ELF3*) | Late flowering. | Earlier flowering time. | Part of a circadian clock input pathway. Can regulate the initiation of flowering independently of phyB. | Meyer & Purugganan, 2013; Herrero et al., 2012 |
| *INTERMEDIUM-C* (*INT-C*) | Tillering and sterile lateral spikelet. | Increased expression causes suppression of tillering and male fertility in lateral spikelets. | R[egulation of shoot system development](https://www.ebi.ac.uk/QuickGO/term/GO:0048831). Mutation of the gene is correlated with lateral spikelet fertility phenotypes. | Meyer & Purugganan, 2013; Ramsay et al., 2011; Ramsay et al., 2011. |
| *Oryza sativa | Oryza latifolia*, *Oryza glumaepatula* (Bortolotto et al., 2015) | *PROSTRATE GROWTH1* (*PROG1*) | Prostrate growth. | Asymmetrical growth of tiller base leading to erect growth. | Inactive prog1 results in the conversion of prostrate to erect growth habit in domesticated rice. | Meyer & Purugganan, 2013; Tan et al., 2008 |
| *SHATTERING4-1* (*SH4-1*) | Easily shattering seeds. | Lack of an abscission layer leads to seed non-shattering. | Responsible for rice grain shattering. | Meyer & Purugganan, 2013; Li et al., 2006; [Lin et al., 2007](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2759215/#MCM224C40) |
| *BLACK HULL4* (*BH4*) | Black hull. | White hull. | Controls black hull color. | Meyer & Purugganan, 2013; Zhu et al., 2011 |
| *Red pericarp* (*Rc*) | Red pericarp. | White pericarp (absence of anthocyanin). | Required for red pericarp in rice- proanthocyanin synthesis related gene. | Meyer & Purugganan, 2013; Sweeney et al., 2006 |
| *AMMONIUM TRANSPORTER1;1* (*AMT1;1*) | Poor nitrogen uptake mechanism. | Modified nitrogen uptake and response. | It is a high affinity ammonium transporter which may be involved in ammonium uptake from the soil. | Meyer & Purugganan, 2013; Filiz and Akbudak, 2020. |
| *LIGULELESS1* (*LG1*) | Open the panicle and easily shatter seeds. | Altered panicle growth results in closed panicles and reduced shattering. | Controls laminar joint formation between leaf blade and leaf sheath and controls ligule and auricle development. | Meyer & Purugganan, 2013; Lee et al., 2007 |
| *BETAINE ALDEHYDE DEHYDROGENASE2* (*BADH2*) | Non fragrant grains. | Fragrant grains. | Plays a key role in the accumulation of a fragrant compound, 2-acetyl-1-pyrroline (2AP). An inactive BADH2 promotes fragrance in rice. | Meyer & Purugganan, 2013; Baicharoen et al., 2018 |
| *GRAIN WIDTH5* (*GW5/SW5)*) | Small sized seeds. | Increase seed size by increasing cell number of outer glume layer. | Controls rice grain width and weight | Meyer & Purugganan, 2013; Weng et al., 2008 |
| *GRANULE BOUND STARCH SYNTHASE I* (*Waxy*; *GBSSI)* | Non glutinous grains. | Glutinous grains. | It controls amylose synthesis in endosperm. | Meyer & Purugganan, 2013;  Merida et al., 1999; Han et al., 2019. |
| *GRAIN SIZE3* (*GS3*) | Short grain. | Long grain phenotype. | Contributes to seed or grain size. | Meyer & Purugganan, 2013; Takano-Kai et al., 2009 |
| *SHATTERING1* (*Sh1*) | Shattering. | Reduction in shattering. | Controls shattering. | Meyer & Purugganan, 2013;; [Li et al., 2006](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2759215/#MCM224C39). |
| *HEADINGDATE1* (*HD1*) | Early flowering. | Delayed flowering time. | A regulator of the florigen gene Hd3a. | Meyer & Purugganan, 2013; Takahashi & Shimamoto, 2011 |
| *Quantitative trait locus of seed shattering on chromosome 1 (qSH1)* | Shattering seeds. | Loss of seed shattering because of the absence of abscission layer. | Regulates seed shattering. | [Konishi et al., 200](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2759215/#MCM224C38)6; [Li et al., 2006](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2759215/#MCM224C39). |
| *Zea mays | Setaria italica, Lolium perenne, Digitaria exilis, Avena sativa, Secale cereale* (Hulbert et al., 1990) | *teosinte glume architecture 1* (*Tga1*) | Hard glume. | Softer glume. | Repress the growth of lateral branches in length and numbers. | Meyer & Purugganan, 2013; Dorweiler and Doebley 1997; Doebley et al., 1995;  Wang et al., 2005; Wang et al., 2015. |
| *zea agamous-like1* (*Zagl1*) | Small female ear. | Increase in female ear length. | Role in flowering time and ear size. | Meyer & Purugganan, 2013 |
| *ramosa1* (*ra1*) | Many branches with multiple ears on each branch and tassel at the tip of the branch. | Affects kernel organization, altered inflorescence architecture. | Regulate the inflorescence branching systems. | Meyer & Purugganan, 2013; Yang 2011 |
| *PROLAMIN BINDING FACTOR* (*PBF*) | Less storage protein. | Altered prolamin protein levels in seeds. | Controls the expression of seed storage protein (zein) genes. | Meyer & Purugganan, 2013; |
| *teosinte branched 1* (*TB1*) | Many branches with multiple ears on each branch and tassel at the tip of the branch. | Increased expression causes short, ear-tipped branches. | It is involved in apical dominance. It has a significant role in repression of axillary organs. | Meyer & Purugganan, 2013; Wang et al., 2015; Doebley et al., 1991; [Hubbard *et al.*, 2002](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2759215/#MCM224C34). |
| *SHATTERING1-5.1, SHATTERING1-5.2* (*Sh1-5.1-Sh1-5.2*) | Easily shattering. | Non-shattering phenotype because of lack of abscission layer. | Play a key role in establishment of the abscission layer and is responsible for grain shattering. | Meyer & Purugganan, 2013; Li et al., 2006. |
| *BARREN STALK1* (*BA1*) | Presence of axillary meristem. | Prevents axillary meristem development. | Modulates maize inflorescence. Also regulates vegetative lateral meristem. | Meyer & Purugganan, 2013; Gallavotti et al., 2004 |
| *CO, CO-LIKE, and TIMING OF CAB1* (*CCT*) | Late flowering. | Lower expression leads to earlier flowering. | *CO*, *CO-like* and *TIMING OF CAB1* modulate flowering time. | Meyer & Purugganan, 2013; Putterill et al., 1995; Li et al., 2017 |
| *MADS19* (*zmm19*) | Kernels without glume covering. | Ectopic expression in inflorescences leads to kernels covered by glumes. | Loss of the MADS19 results in larger glumes. | Meyer & Purugganan, 2013; Han et al., 2012 |
| *SUGARY1* (*Su1*) | Non sweety taste. | Altered starch biosynthesis, sugary sweet taste. | Key role in [starch biosynthetic process](https://www.ebi.ac.uk/QuickGO/term/GO:0019252) | Meyer & Purugganan, 20133; James et al., 1995; Dinges et al., 2001. |
| *SHATTERING1* (*Sh1*) | Shattering phenotype. | Non-shattering phenotype because of lack of abscission layer. | Promotes grain shattering through an abscission layer. | Meyer & Purugganan, 20133; Li et al., 2006 |
| *Glycine max | Canavalia ensiformis, Canavalia gladiata, Lupinus mutabilis, Cajanus cajan,  Phaseolus  mungo, Vigna unguiculata, Phaseolus vulgaris, Lens culinaris, Vicia faba, Phaseolus aconitifolius, P calcaratus, P lunatus, Lathyrus sativus , Cyamopsis tetragonolobus, Dolichos lablab, and Arachis hypogaea* (Smartt, 1990; Weeden, 2007) | *TERMINAL FLOWER1b* (*TFL1b*) | Indeterminate shoots. | Determinate shoots end with terminal inflorescence. | Maintains indeterminate growth of cells in the shoot apical meristem. | Meyer & Purugganan, 2013; Goretti et al., 2020 |
| *Setaria italica | Setaria faberi, S. viridis, S. pumila, Panicum glaucum, P. miliaceum* (wild foodshomegarden.com) | *GRANULE BOUND STARCH SYNTHASE I* (*GBSSI*) | Non-glutinous grains. | Glutinous grains. | The gene is involved in starch biosynthesis. | Meyer & Purugganan, 2013; Fukunaga et al., 2002; Fukunaga et al., 2002; Seung, 2020. |
| *Solanum lycopersicum | Solanum quitoense, Solanum macrocarpon, Physalis prunisa, Physalis minima* (Mueller et al., 2005; Lemmon et a;. 2018) | *FASCIATED* (*FAS*) | Small fruit size. | Increased cell proliferation leads to larger fruit. | Promotes cell size growth. | Meyer & Purugganan, 2013; Rodríguez et al., 2011. |
| *fruit weight 2.2* (*FW2.2*) | Less number of locules. | Increase in locule number in fruit. | Regulates fruit size. | Meyer & Purugganan, 2013; Li et al., 2019; Paterson et al., 1988 |
| *OVATE* (*OVATE*) | Non expensed fruit neck region. | Expansion of fruit neck region. | Key regulator of fruit shape. | Meyer & Purugganan, 2013; Wang et al., 2016 |
| *SUN* (*SUN*) | Non elongated fruit. | Increased growth resulting in elongated fruit. | Major gene controlling the elongated fruit shape. | Meyer & Purugganan, 2013; Wu et al., 2011) |
| *LOCULE NUMBER* (*LC*) | Fruits having two locules. | Fruits have 3-4 locules instead of 2 locules. | Control fruit shape. | Meyer & Purugganan, 2013; Rodríguez et al., 2011 |
| *Vitis vinifera* | *Cissus discolor, Cayratia pedata, Cissus mollissima, Ampelocissus  latifolia* (Rossetto et al., 2001) | *myb-related transcription factor* (*MYBA1*) | Dark coloured berry. | Lack of anthocyanins lead to white berry color. | Controls the last steps in the anthocyanins biosynthesis pathway. | Meyer & Purugganan, 2013; Péros et al., 2015 |
| *myb-related transcription factor* (*MYBA2*) | Dark coloured berry. | Lack of anthocyanins lead to white berry color. | Control the anthocyanin biosynthesis pathway. | Meyer & Purugganan, 2013 |

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