

Amaranth Grain as a Cash Crop for Export from Nepal

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Introduction

Amaranth is a name which refer to a group of plant species which can be considered a pseudo cereal. However, it is a dicot and not taxonomically related to the Poaceae family, however it does possess a very similar nutrient profile earning it the cereal nickname[1]. In appearance, it is very tall with large broad leaves and bright red, gold or purple flowers which are often very aesthetically pleasing causing the plant to sometimes be grown for purposes other than food[1]. The name amaranth itself refers to more than 60 different plant species, including *Amaranthus caudatus*, *Amaranthus cruentus*, and *Amaranthus hypochondriacus* which are the varieties which are commonly used as a grain[1]. Amaranth grain has some potential as both a domestic and trade cash crop in Nepal.

History

Amaranth originated in Peru and it was a food source commonly consumed by hunter-gatherer societies in North and South America until being independently domesticated in both Mexico and the Andes at approximately 5,000 B.C. [2]. The Aztec civilization which would later arise in the Mexican region would use amaranth as one of its most important ritual and cash crops. Often gifts of amaranth to Montezuma would almost equal that of corn or beans in terms of size[2]. It's possible that the use of amaranth grain fell out of mainstream use after the Spanish conquered the Aztecs in the 1500s and sought ways of discouraging local culture and religion [3].

Uses and Value

Amaranth has one of the highest amounts of protein among any grain or grain equivalent, and is also very high in calcium, potassium, iron, zinc, phosphorous as well

as vitamins A and C[4]. Combined with corn, it forms a full protein and the leaves and other portions of the plant are edible in addition to the seed which is the most commonly consumed part. Mexican studies have shown that adding small amounts of amaranth to the diets of children has a positive effect in reducing malnutrition which is a benefit which could greatly influence the lives of young children in Nepal [4]. It is important to note however, that amaranth is deficient in the two important amino acids threonine and leucine[5]. Amaranth grain itself can be ground down into flour for use in many different common, everyday food items such as bread, cereal, cookies, granola, noodles, pancakes and other products that are flour based[6]. In addition for its use as flour, amaranth is often flaked like oatmeal[6] or popped like popcorn for use as a snack with the addition of molasses[2]. The popped seeds are also sometimes boiled or fried and grain is sometimes fermented to make beer, while dried stocks can be used as a fuel source[2]. The flowers are often used by indigenous groups in North and South America as remedies for toothaches and fevers[2]. In terms of its market value, amaranth grain tends to be profitable to grow as it has been shown under research conditions that it can consistently produce yields of 3000 kg/ha (over the approximate minimum amount of 1000 kg/ha in order to be profitable)[3]. The downside to this is that amaranth can be a risky crop, with near entire crop failures or crop losses as a result of lodging or seed shattering[3]. It is also considered expensive by potential buyers who note that the price of \$0.90-1.00 per kilogram needs to be reduced by $\frac{1}{3}$ to $\frac{1}{2}$ before it can become marketable to a larger consumer base[3]. Redeeming factors when it comes to marketing to a foreign market such as Canada include it's being high in protein, high in the essential amino acid lysine (an amino acid which is typically deficient

in other cereal crops), and being linked to a reduction in cholesterol in animals fed with this grain[6].

Characteristics

Amaranth tends to be five to seven feet tall when fully mature, with a thick, tough stem, and it produces small oblong/round shaped seeds approximately 1 mm in diameter[6].

Environmental Requirements

The plant responds very well to warmth and a large amount of sunlight, tends to be very drought tolerant as it matures and is already grown in some areas on Nepal[6].

Planting

Planting methods that have proven to be effective and efficient in developing countries (such as Mexico and Peru) include the use of an Aztec floating garden system (called 'chinampas') which involves creating seed beds using fertile mud until the plants are approximately 20 cm tall at which point they can be transplanted[2]. They are then planted approximately 1 meter apart and fertilized; once they reach a height of 1 meter they are hilled using sod in order to support the stock and suppress weeds[2]. Other methods of planting include seeding in a thin line atop a layer of manure or placing seeds at a distance of one stride apart and sometimes intercropped with other plants such as corn[2]. Some disadvantages to planting amaranth, especially in Nepal, include the need for a fine, firm seedbed which should not be sloped (eliminating the possibility for hillside farming without terraces), the lack of any chemical herbicides that can be used with amaranth (causing very labour intensive weeding methods to be necessary

until the plants have reached a height of approximately 1 foot) and the lack of any very effective way to deal with other pests such as insects[6].

Harvesting

Harvesting can be risky without utilizing the proper machinery or techniques otherwise the majority of a yield can be lost[6].

Market/Export Potential

It may be possible to have domestic infrastructure support in Nepal for amaranth in Nepal (e.g. extension) as it is already a crop which is known, grown and sold in Nepal. In North America and specifically Canada, there seems to be a minimal market potential at the moment. The most likely consumers however, would be anyone who is allergic to wheat products or consumers who prefer the health foods market or whole grain foods as a result of amaranth's good nutritional profile[6]. Unfortunately there are few large firms who seem willing to purchase amaranth and minimal support among smaller niche firms in North America.

References

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