The Morphological Characteristic of *Amaranthus spp.* for conservation in DOA genebank of Thailand

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Abstract

The objective of this study was to characterize morphological characteristics of 125 accessions of Amaranthus spp. collected from southern and eastern regions of Thailand. Characterization of plant height (cm), number of leaf per plant at flowering stage, and stem and leaf colour of a plant were done at Biotechnology Research and Development Office, Department of Agriculture from February 2020 to June 2020. It was found that there were statistically significant differences in all characters among accessions. N31 (green stem and leaf) has highest stem height (162 cm) and its average number of leaf per plant was 40. The highest number of leaf per plant was 46 which was found in N116 (green stem and leaf) and its average stem height was 98 cm. In addition, it was revealed that there were green and reddish-green colours found in collected samples. As a result, further studies on plant improvement should be done in the future.

Introduction

Amaranth is a tropical plant which is not fully exploited but its value in the modern world is now being recognized. Tucker (1986) described amaranth as “the once and future crop” while Cai et al. (2004) cited that it is a rediscovered “new” crop. Osava (2010) mentioned that the US National Academy of Sciences declared amaranth as “the best food of plant origin for human consumption.” Amaranth species have been reported to be distributed and utilized for food as a vegetable worldwide (Lavernee S. Gueco et al. 2016).

Amaranth both leaves and grains are rich in vitamins A, (2917 IU) and vitamin C (43.5 mg), iron (2.32 mg), calcium (215 mg), potassium (135-611 mg), phosphorus (50-148 mg), protein (2.46-3.8 g), and lysine (0.13-0.34 g). Amaranth is an annual crop that grows rapidly and is harvested within 3–4 weeks after sowing for leaves while grain can be harvested at 60-90 days. The crop is also known for being tolerant to common vegetable disease and pest incidences and less labour-demanding. (AVRDC, 2004).

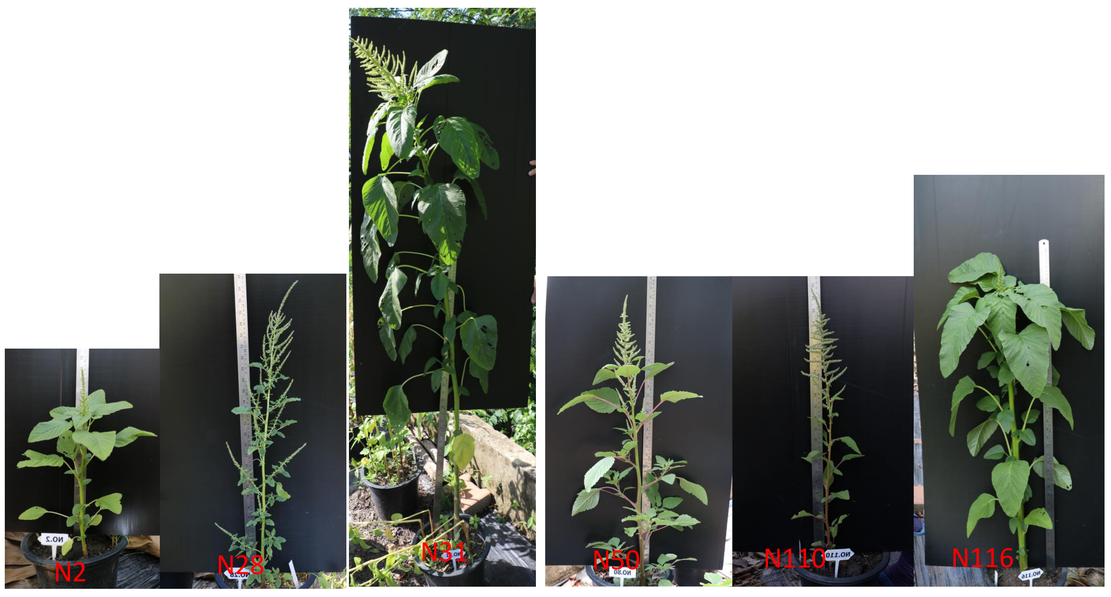

Figure 1. The different accessions of amaranth

Methology

The different accessions of amaranth collected from southern and eastern regions of Thailand. The seeds were sown in seed boxes in a screen fields and watered daily. The seedlings were transplanted after 3 weeks in 12.5 x 12.5 cm plastic bags and a basal fertilizer of 5 g per plant of urea (46-0-0) was applied. 125 accessions and 2 plants per accession were planted for morphological characterization. Watering was done regularly to ensure the normal growth and development of the plants. Weeding was also done whenever necessary. Morphological characterization was carried out using standard descriptor for amaranth, Plant height (cm) at flowering stage, Number of leaf per plant, Stem colour. Stem shapes and Branching, Leaf colour and Leaf shape.

Figure 2. Morphological characteristics of stem in terms of Colours, Shapes, and Branching

Results

The total of 2 quantitative traits and 4 qualitative characterizes were observed. It was found that there were statistically significant differences in Plant height and Number of leaf per plant characters among accessions. N31 (green stem and leaf) has the heighest stem (162 cm) and its mean number of leaf per plant was 40. The highest number of leaf per plant was 46 which was found in N116 (green stem and leaf) and its mean stem height was 98 cm. (figure 1). In addition, it was revealed that there were green and reddish-green colours found in collected samples (Figure 2). For the leaf; there was similar characteristics (Figure 3).

Figure 3. Morphological characteristics of Leaf colours and Leaf shape

Conclusion

The value of amaranth is now being recognized, as evident by the rapid expansion in its production in different parts of the world. It is a cheap source of nutrients and antioxidants, easy to grow, and adapted to local growing conditions. Its potential as an alternative source of food is becoming popular because of the increasing demand for healthy foods in the market. Increasing the demand will allow farmers to produce more allowing its conservation through use. As a result, further studies on plant improvement should be done in the future.

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