

Morphological, Physico-chemical, and Pollen Grain Description of some Guava Varieties in Egypt

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AMONG the national objectives of the National Gene Bank and Genetic Resources (NGBGR) in Egypt are the collection, conservation, characterization, and evaluation of agricultural genetic resources. The present study investigates the physico-chemical characteristics, the morphological characterization and pollen grain fertility and sterility of some guava varieties grown in Egypt. Guava varieties used in the present work were Banaty, Mobakker, Fakous, Gize yellow, Montakhab Elkanater and Montakhab- Elsabaheya.

Twenty-seven morphological characteristics were studied to describe the tree, leaf, inflorescence, fruit, and seed. The morphological characterization showed wide range of differences among varieties. Characterization of tree shape resulted in four semielliptic varieties (Banaty, Mobakker, Fakous, and Montakhab- Elsabaheya), one obovate in Gize yellow and one was semicircular in Montakhab- Elkanater. The morphological characterization of leaf shape showed six different shapes roundish in Banaty, lanceolate in Mobakker, oval in Fakous, oblong in Gize yellow, oblong-lanceolate in Montakhab- Elkanater and obovate in Montakhab- Elsabaheya. Fruit shape studies showed five different shapes pyriform, globose, obovoid, ovoid and oblate. Shape of fruit apex demonstrated that three varieties were truncate (Banaty, Gize yellow and Montakhab- Elkanater), two were rounded (Mobakker and Fakous), and one was necked in Montakhab- Elsabaheya. Differences in fruit skin color among varieties revealed that one was light yellow, one was pale yellow, one was cream yellow, one was dark yellow and two were yellow. Other morphological studies are investigated and will be presented.

The physical and chemical analysis conducted included pH, titratable acidity, soluble solid content (SSC), total solid, ascorbic acid content and free sugar analysis (Fructose, Glucose and Sucrose). Results indicated that, total (SSC) were less than 8%. The pH and titratable acidity ranged from 3.96 in Fakous to 4.65 in Montakhab- Elsabaheya and 0.14% in Mobakker to 0.19% in Montakhab- Elkanater, respectively. The total solid varied from 100.1 g kg⁻¹fw in Montakhab- Elsabaheya to 134.2 g kg⁻¹fw in Fakous. The vitamin C content varied from 34.03 mg/100g in Gize yellow to 50.9 mg/100g in Montakhab- Elkanater. The free sugar analysis (Fructose, Glucose and Sucrose) ranged from 4.4 g/100g in Montakhab- Elsabaheya to 19.2

g/100g in Fakous, 4.3 g/100g in Fakous and Gize yellow to 6.8 g/100g in Banaty and 5.4 g/100g in Fakous to 14.8 g/100g in Montakhab-Elkanater, respectively.

Studies of pollen grain fertility percentage showed that, Fakous 97.86%, Banaty 97.7%, Gize yellow 96.82% and Montakhab-Elsabaheya 96.7% and 92.16% for Mobakker.

Key words: National Gene Bank and Genetic Resources - Egypt - Guava varieties - Physico-chemical characteristics - Morphological description - Pollen grain Fertility and Sterility.

Guava (*Psidium guajava* L.), which belongs to the Myrtaceae family, is a native of tropical America and is widespread throughout the tropical and subtropical areas (Chopda and Barrett, 2001). Guava is important in international trade and domestic economy of several countries in warmer climates (Menzel, 1985). Because of its easy cultivation under variable soils and climates, high nutritional value, and popular uses in such processed products like juice, preserves, and dairy or bakery items, guava is favorite of billions of people in the tropical and subtropical countries, but not so much in the temperate regions. Due to their astringent properties, mature guava fruits, leaves, roots, bark, and immature fruits, are used in local medicines to treat gastroenteritis, diarrhea, and dysentery (Morton, 1987 and Purseglove, 1968). Guava consumption has been reported to significantly reduce serum total cholesterol, triglycerides, and blood pressure with the opposite effect (an explicit increase) in high-density lipoprotein (HDL) or good cholesterol (Singh *et al.*, 1992). Guava is consumed fresh or made into processed products such as juice, nectar, puree, jam and jelly (Kashyap *et al.*, 2001). Guavas, mangoes and mangosteens are the most important tropical fruit crops grown in Egypt for their unique flavor and nutritional values. The area harvested (ha) in Egypt during 2005 year was 35000 ha. The average productivity per hectare during the same year 380,000 kg/ ha and the export Quantity of Primary Commodity (1000 tonnes) during the same year 10330 T (FAO, 2007).

The guava plant grows symmetrically dome-shaped with broad, spreading, low-branching canopy and a shallow-rooted small tree of 3 to 10 m in height, branching close to the ground and often heavily suckering from the base of the trunk. The green to reddish-brown and smooth bark on older branches and trunk peels off in thin flakes. The four-angled young twigs of guava are easily distinguished. The simple leaves of guava are opposite, 10 to 15 cm long, oval to oblong-elliptic, smooth, and light green in color. The perfect epigynous flowers 25 to 30 mm in diameter with four incurved white petals and a large tuft of white stamens with yellowish anthers, are borne solitary or in clusters of 2-3 in leaf axils on new growth from mature wood. Self-pollination is conspicuous (60% to 75%) since even isolated trees produce good crop; however, the distribution of cross-pollination by insects, is about 35% (Menzel, 1985). Based on the cultivar, guava fruit could be an ovoid, spherical or pyriform berry topped by calyx lobes. Generally, guava fruits measure 4 to 10 cm in diameter and weigh from 100 to

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