

Notas Científicas

Preliminary characterization of *Psidium* germplasm in different Brazilian ecogeographic regions

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Abstract – The objective of this work was to characterize 119 accessions of guava and 40 accessions of “araçá” sampled in 35 Brazilian ecoregions, according to the International Union for the Protection of New Varieties of Plants (UPOV) descriptors. The majority of “araçá” accessions presented wide spacing of leaf veins, while guava accessions presented medium to close spacing. Most fruits of “araçá” accessions were classified as small, contrasting with medium to large fruits of guava accessions. Most of “araçá” accessions (91%) presented white flesh fruit color, while 58% of guava accessions presented pale pink, pink and dark pink colors. Fruit differences among wild and cultivated *Psidium* species indicate fruit as the most altered trait under artificial selection.

Index terms: *Psidium guajava*, araçá, guava.

Caracterização preliminar de germoplasma de *Psidium* em diferentes ecorregiões brasileiras

Resumo – O objetivo deste trabalho foi caracterizar 119 acessos de goiabeira e 40 acessos de araçazeiro identificados em 35 ecorregiões brasileiras, de acordo com descritores da International Union for the Protection of New Varieties of Plants (UPOV). A maioria dos acessos de araçazeiro apresentou grandes espaços entre as nervuras da folha, enquanto os de goiabeira apresentaram espaços pequenos. Os frutos de araçazeiro foram classificados como pequenos, enquanto os de goiabeira apresentaram tamanho de médio a grande. A maioria dos acessos de araçazeiro (91%) apresentou cor branca para a polpa do fruto, enquanto 58% dos de goiabeira apresentaram cor de rosa-claro a rosa-escuro. As diferenças nos frutos entre *Psidium* selvagens e domesticados indicam que os frutos foram os mais alterados pela seleção artificial.

Termos para indexação: *Psidium guajava*, araçá, goiaba.

The Myrtaceae family comprises approximately 130 genera and 3,000 species of trees and shrubs, mostly evergreen and distributed mainly in the tropics and subtropics (Watson & Dallwitz, 2007). The genus *Psidium* ($2n = 2x = 22$) includes about 150 species, which are all fruit-bearing trees or shrubs (Jaiswal & Jaiswal, 2005). *P. guajava* L. (guava) is native of Northern South America and widely distributed in the tropical regions of America (Risterucci et al., 2005). “Araçá” is a general term used in Brazil to refer to wild

Psidium spp., among which *P. cattleianum* Sab., *P. incanescens* Martius, *P. gradiflorum* Martius and *P. arboretum* Vell. are native of South America (Raseira & Raseira, 1996).

Characterization and agronomic evaluation for *P. guajava* were reported by Rodriguez et al. (2004). Raseira & Raseira (1996) reported an extensive work on “araçá”, including genotype characterization.

The objective of this work was to characterize guava and “araçá” accessions, according to the International

Union for the Protection of New Varieties of Plants (UPOV) descriptors for *Psidium guajava*.

Prospecting of wild-growing *Psidium* germplasm species was carried out in 35 ecogeographic zoning regions (EGZRs) of ten Brazilian states, five in Maranhão (MA), five in Sergipe (SE), four in Pernambuco (PE), two in Piauí (PI), two in Bahia (BA), one in Rio Grande do Sul (RS), five in Goiás (GO), six in Rondônia (RO), two in Amazonas (AM) and three in Roraima (RR). An EGZR was defined as a region that has the same type of vegetation, soil and altitude, since it was assumed that *Psidium* spp. adaptation might have been influenced by these factors. An ecogeographic zoning map was used to define the ecoregions within five states of Brazil Northeast. In addition vegetation maps were used to define ecoregions in states of South, Central East and North regions of Brazil. Species samplings were made in EGZRs inhabited by the least developed rural human population, in order to avoid the prospecting of recently introduced guava germplasm. For the same reasons, sampling was avoided, when possible, within urban areas. For each individual plant, in situ pictures were taken and geographic coordinates with a GPS and physical reference sites were also recorded.

Guava and “araçá” plants sampled in different ecoregions were characterized for one, 20, 17 and two descriptors of stem, leaves, fruits and seeds, respectively (Table 1), according to UPOV guidelines (International Union for the Protection of New Varieties of Plants, 1987). Simple percentages were estimated for the applied UPOV guava descriptors, while for others, such as leaf and fruit length, leaf and fruit width and spacing of leaf veins, prior measurements were taken before grouping into a specific descriptor class.

A hundred nineteen accessions of guava and 40 accessions of “araçá” from 35 different ecoregions were characterized, with the following distribution by Brazilian state: MA – 25 of guava and one of “araçá”; PI – three of guava and one of “araçá”; SE – 12 of guava and two of “araçá”; BA – ten of guava and seven of “araçá”; PE – nine of guava and four of “araçá”; RS – five of guava and five of “araçá”; RO – 15 of guava and five of “araçá”; RR – seven of guava and four of “araçá”; GO – 17 of guava and seven of “araçá”; and AM – 16 of guava and four of “araçá”.

The majority of “araçá” accessions (86%) presented wide spacing of leaf veins, while guava accessions presented medium (65%) and close (33%) spacing (Table 1). In the field, this descriptor was used to separate, in some cases, accessions of “araçá” from

Table 1. Germplasm characterization of 119 accessions of guava (*Psidium guajava*) and 40 accessions of “araçá” (*Psidium* spp.), based on the UPOV descriptors, identified in 35 different Brazilian ecoregions.

Descriptor	Class	Percentage (%)	
		“Araçá”	Guava
Stem descriptor			
Color of young shoot	Green	63	61
	Yellow green	6	9
	Reddish	31	30
Young leaf descriptors			
Anthocyanin coloration	Absent	45	30
	Present	55	70
Anthocyanin coloration - intensity	Weak	30	39
	Medium	30	39
	Strong	40	22
Pubescence on lower side	Sparse	70	61
	Dense	16	34
	Very dense	14	5
Fully developed leaf descriptors			
Length of blade	Short	16	13
	Medium	54	66
	Long	30	21
Width of blade	Narrow	24	35
	Medium	62	60
	Broad	14	5
Length/width blade ratio	Low	24	21
	Medium	68	65
	High	8	14
Shape	Round	3	0
	Ovate	0	3
	Obovate	47	17
	Trullate	8	14
	Obtrullate	39	38
	Oblong	3	28
Curvature in cross section	Weak	54	29
	Medium	27	44
	Strong	19	27
Twisting	Absent	84	58
	Present	16	42
Curvature of midrib	Absent	78	26
	Present	22	74
Degree of curvature of midrib	Weak	88	53
	Medium	12	33
	Strong	0	14
Variegation	Absent	98	98
	Present	2	2
Green color	Green	65	48
	Dark green	35	52
Spacing of secondary veins	Close	0	33
	Medium	14	65
	Wide	86	2
Relief of surface of upper side	Smooth	83	83
	Medium	17	17
Pubescence on lower side	Absent	51	16
	Sparse	22	64
	Medium	8	19
Undulation of margin	Dense	19	1
	Absent	43	18
	Present	57	82
Degree of undulation of margin	Weak	76	54
	Medium	24	44
	Strong	0	2
Shape of base	Obtuse	76	28
	Rounded	19	30
	Cordate	5	42
Shape of tip	Apiculate	3	0
	Acute	3	6
	Obtuse	62	70
	Rounded	32	24

Continue...

Table 1. Continuation...

Descriptor	Class	Percentage (%)	
		"Araçá"	Guava
Fruit descriptors			
Length	Short	53	4
	Medium	47	64
	Long	0	32
Width	Narrow	56	3
	Medium	41	63
	Broad	3	4
Length/width fruit ratio	Small	50	40
	Medium	41	54
	Large	9	6
Shape at stalk end	Broadly rounded	42	15
	Rounded	32	31
	Truncate	5	2
	Pointed	10	26
	Necked	11	26
Neck width in relation to that fruit	Narrow	67	26
	Medium	33	55
	Broad	0	19
Color of skin	Pale yellow	28	46
	Dark yellow	44	42
	Orange green	28	12
Relief of surface	Smooth	54	58
	Rough	43	32
	Bumpy	3	10
Longitudinal ridges	Absent	97	93
	Present	3	7
Prominence of longitudinal ridges	Weak	100	75
	Medium	0	25
Longitudinal grooves	Absent	100	95
	Present	0	5
Size of sepal	Small	16	26
	Medium	43	47
	Large	41	27
Diameter of calyx in relation to that of fruit	Small	69	54
	Medium	25	46
	Large	6	0
Ridged collar around calyx cavity	Inconspicuous	57	43
	Conspicuous	43	57
	White	11	10
Color of flesh	Cream	80	18
	Pale pink	9	29
	Pink	0	20
	Dark pink	0	18
	Orange pink	0	3
	Orange	0	2
	Evenness of color flesh	Even	81
Grittiness of outer flesh	Mottled	19	24
	Absent	33	64
Thickness of outer flesh in relation to core diameter	Present	67	36
	Thin	78	10
Seed descriptors	Medium	22	80
	Thick	0	10
	Seed descriptors		
Number	Few	30	12
	Medium	32	67
	Many	38	21
Size	Small	41	19
	Medium	35	73
	Large	24	8

those of guava. For fruit length, only a few guava accessions (4%) were grouped in the short class, while

53% of "araçá" accessions were classified into the short class. For fruit width, only a few guava accessions (3%) were grouped in the narrow class, while 56% of "araçá" accessions were classified into the narrow class (Table 1). These differences in fruit size could be attributed to the long-term selection to which guava, a *Psidium* cultivated species, has been submitted, in opposition to wild-growing "araçá".

Another difference among "araçá" and guava accessions was observed in the fruit shape at the stalk end: "araçá" accessions were grouped into the classes of broadly rounded and rounded (74%), while those of guava were grouped into the classes of pointed and necked (52%) (Table 1). Regarding flesh fruit color, "araçá" accessions were grouped as cream (80%), white (11%) and pale pink (9%), while guava accessions were almost evenly distributed among all seven classes of UPOV for this descriptor. The most common colors of guava flesh were pale pink (29%), pink (20%), dark pink (18%) and cream (18%). According to Gonzaga Neto et al. (2001), pink and orange colors are largely accepted by Brazilian market, which could explain the concentrations of prospected guava germplasm into these classes.

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