

Taxonomic significances of seed morphology in some tribes of subfamily Malvoideae (Malvaceae) in Saudi Arabia

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Supplementary Table 1. Seeds macro- and micromorphological characters of the studied taxa using light and scanning electron microscopes.

N	Taxon	Size (L x W) mm	Shape	Sides	Symmetric or asymmetric	Seed apex	Seed base (hilum side)	Color	Indumentum	Hilum
1	<i>Abutilon bidentatum</i>	1.8 x 2	Cordate reniform	Flat	symmetric	obtuse	reniform	brown	hirtuse	basal
2	<i>Abutilon figarianum</i>	1.8 x 1.8	Cordate reniform	Convex	asymmetric	obtuse	reniform	dark brown	strigose	basal
3	<i>Abutilon fruticosum</i>	1.8 x 1.7	Cordate reniform	Convex	asymmetric	obtuse	reniform	dark brown	hirtuse	basal
4	<i>Abutilon grandifolium</i>	1.9 x 2.2	Cordate reniform	Convex	symmetric	obtuse	reniform	black	strigose	basal
5	<i>Abutilon hirtum</i>	1.8 x 1.9	Cordate reniform	Flat	asymmetric	obtuse	reniform	dark brown	glabrous	basal
6	<i>Abutilon muticum</i>	1.4 x 1.5	Cordate reniform	Concave	asymmetric	obtuse	reniform	dark brown	glabrous	basal
7	<i>Abutilon pannosum</i>	1.8 x 1.7	Cordate reniform	Convex	symmetric	obtuse	reniform	dark brown	strigose	basal
8	<i>Abutilon ramosum</i>	2 x 2.1	Cordate reniform	Concave	asymmetric	obtuse	reniform	dark brown	hirtuse	basal
9	<i>Althaea ludwigii</i>	1.8 x 1.9	Rounded reniform	Concave	asymmetric	obtuse	reniform	brown	glabrous	basal
10	<i>Fioria vitifolia</i>	2 x 2.7	Deltoid reniform	Concave	asymmetric	acute	reniform	dark brown	glabrous	basal
11	<i>Hibiscus aponeurus</i>	1 x 1.5	Cordate reniform	Concave	asymmetric	truncate	reniform	black	glabrous	basal
12	<i>Hibiscus deflersii</i>	1.7 x 2.4	Cordate reniform	Concave	asymmetric	obtuse	reniform	reddish brown	densely woolly	basal
13	<i>Hibiscus micranthus</i>	1.6 x 2.5	Cordate reniform	Concave	asymmetric	truncate	reniform	light brown	densely woolly	basal
14	<i>Hibiscus purpureus</i>	2.1 x 2.8	Cordate reniform	Flat	asymmetric	obtuse	reniform	dark brown	densely woolly	basal
15	<i>Hibiscus trionum</i>	1.8 x 2.3	Cordate reniform	Flat	asymmetric	obtuse	reniform	dark brown	glabrous	basal
16	<i>Malva neglecta</i>	1.7 x 2	Rounded reniform	Flat	symmetric	obtuse	reniform	dark brown	glabrous	basal
17	<i>Malva parviflora</i>	1.4 x 1.6	Rounded reniform	Concave	symmetric	obtuse	reniform	brown	glabrous	basal
18	<i>Malva verticillate</i>	2.1 x 1.8	Rounded reniform	Concave	asymmetric	obtuse	reniform	dark brown	glabrous	basal
19	<i>Malva sylvestris</i>	1.6 x 1.7	Rounded reniform	Convex	asymmetric	obtuse	reniform	brown	glabrous	basal
20	<i>Pavonia arabica</i>	1.7 x 2	Ovate trigonous	Concave	asymmetric	obtuse	reniform	brown	sparsely pubescent	basal
21	<i>Pavonia burchellii</i>	2.1 x 2.3	Ovate trigonous	Convex	asymmetric	obtuse	reniform	brown	glabrous	basal
22	<i>Pavonia triloba</i>	2.3 x 2.1	Ovate trigonous	Concave	asymmetric	obtuse	reniform	brown	sparsely pubescent	basal
23	<i>Senra incana</i>	1.7 x 2.8	Broadly reniform	Concave	symmetric	obtuse	reniform	brown	densely pilose	basal
24	<i>Sida alba</i>	1.6 x 1.1	ellipsoid reniform	Flat	asymmetric	obtuse	reniform	dark brown	glabrous	sub basal
25	<i>Sida alii</i>	2.3 x 2.8	D-Shape	Flat	symmetric	obtuse	truncate	dark brown	glabrous	terminal
26	<i>Sida ovata</i>	3.3 x 4.2	D-Shape	Flat	symmetric	obtuse	truncate	dark brown	glabrous	terminal

27	<i>Sida rhombifolia</i>	1.7 x 1.5	ellipsoid reniform	Concave	asymmetric	obtuse	reniform	dark brown	glabrous	sub basal
28	<i>Sida spinosa</i>	3.1 x 4.2	ellipsoid reniform	Flat	asymmetric	obtuse	reniform	dark brown	glabrous	basal

Supplementary Table 2. Seeds epidermal cells characters of the studied taxa.

N	Taxon	Surface pattern	Epidermal cell shape	Anticlinal boundaries	Periclinal cell wall
1	<i>Abutilon bidentatum</i>	reticulate-foveate	polygonal	Raised, thick, ridged, rough	concave, verrucate, rough
2	<i>Abutilon figarianum</i>	reticulate-foveate, verrucate	Penta-hexagonal	Raised, thick, ridged, rough	concave, verrucate to rugose, smooth
3	<i>Abutilon fruticosum</i>	reticulate-foveate, verrucate	polygonal	Raised, thick, ridged, rough	flat, rugose, rough
4	<i>Abutilon grandifolium</i>	reticulate-foveate, verrucate	Penta-hexagonal	Raised, thick, ridged, rough	concave, rugose, smooth
5	<i>Abutilon hirtum</i>	reticulate-foveate, verrucate	polygonal	Raised, thick, ridged, rough	flat, rugose, rough
6	<i>Abutilon muticum</i>	foveate, verrucate	Isodiametric	Raised, thick, ridged, rough	sunken
7	<i>Abutilon pannosum</i>	reticulate-foveate, verrucate	Isodiametric to angular	Raised, thick, ridged, rough	flat, undifferentiated, smooth
8	<i>Abutilon ramosum</i>	reticulate-foveate, verrucate	Penta-hexagonal	Raised, thick, ridged, rough	flat, rugose, rough
9	<i>Althaea ludwigii</i>	reticulate, transversely scalariform	Elongated polygonal	Raised, thick, ridged, rough	flat, transversely ridged, rough
10	<i>Fioria vitifolia</i>	foveate, tuperclate	Isodiametric to angular	Raised, thick, striate, smooth	concave, verrucate, rough
11	<i>Hibiscus aponeurus</i>	alveolate, rugose	Irregularly polygonal	Raised, thin, undulate, smooth	concave, verrucate, rough
12	<i>Hibiscus deflersii</i>	alveolate, rugose	Irregularly polygonal	Raised, thin, undulate, smooth	concave, verrucate, rough
13	<i>Hibiscus micranthus</i>	alveolate, rugose	Irregularly undulate	Raised, thin, undulate, smooth	concave, verrucate, rough
14	<i>Hibiscus purpureus</i>	reticulate, rugose with silky trichomes	polygonal	Raised, thick, ridged, rough	concave, verrucate, rough
15	<i>Hibiscus trionum</i>	reticulate, transversely rugose	Penta-hexagonal	Raised, thick, scabrate, rough	flat, rugose, rough
16	<i>Malva neglecta</i>	rugose, transversely scalariform	Elongated rectangular	Raised, thin, smooth	flat, undifferentiated, smooth
17	<i>Malva parviflora</i>	rugose, transversely scalariform	Elongated rectangular	Raised, thin, smooth	concave, verrucate, rough
18	<i>Malva verticillate</i>	rugose, transversely scalariform	Elongated rectangular	Raised, thin, smooth	flat, verrucate, rough
19	<i>Malva sylvestris</i>	rugose, transversely scalariform	Elongated rectangular	Raised, thin, smooth	flat, undifferentiated smooth
20	<i>Pavonia arabica</i>	reticulate, transversely rugose	Penta-hexagonal	Raised, thin, smooth	flat, verrucate, rough
21	<i>Pavonia burchellii</i>	Irregularly rugose	Irregular undulate	Raised, thin, undulate, smooth	sunken
22	<i>Pavonia triloba</i>	reticulate, verrucate	Penta-hexagonal	Raised, thick, foveate to verrucate, rough	concave, irregular pusticulate, smooth
23	<i>Senra incana</i>	Irregularly rugose	Irregularly undulate	Raised, thick, rugose, rough	concave, verrucate, rough
24	<i>Sida alba</i>	reticulate, foveate	Penta-hexagonal	Raised, thin, smooth	flat, verrucate, rough
25	<i>Sida alii</i>	reticulate, transversely striate	Penta-hexagonal	Raised, thin, foveate, rough	concave, verrucate to striate, rough
26	<i>Sida ovata</i>	reticulate, transversely striate	Penta-hexagonal	Raised, thin, ribbed, rough	concave, striate, smooth
27	<i>Sida rhombifolia</i>	reticulate - rugose, foveolate	Irregular isodiametric	Raised, thick, scabrate, rough	sunken
28	<i>Sida spinosa</i>	rugose, verrucate	Penta-hexagonal	Raised, thin, smooth	flat, verrucate, rough